



FRIDAY, JULY 14, 1899.

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Contributions.

Heat Tests of Car Wheels.

To the Editor of the Railroad Gazette:

The communication in your issue of July 7, signed "X," calls attention to a somewhat important point regarding the transmission of heat through metals, and may lead the reader to doubt the accuracy and fairness of the conclusions in the important and apparently careful thermal tests of car wheels made by Profs. Goss and Smart and the Griffin Wheel Co. As I understand it, "X" simply assumes that Rankine's assumption (which he refers to as Rankine's formula and law), in effect, that the quantity of heat conducted through a plate is proportional to the square of the difference in temperatures when that difference is great, is probably nearer correct than the assumption that the quantity conducted is proportional to the difference of temperatures.

If the point argued by "X" can be sustained, it is apparent that misleading conclusions have been drawn from the tests. Until we learn, however, more particulars from those who conducted the experiments, would it not be well to accept what is usually regarded as a sound assumption, that the difference in temperatures is a measure of the "severity of the tests" as assumed in the article of June 9? This same fact is often stated in treatises in effect that the quantity of heat conducted through a plate is proportional to the difference in temperatures on the two sides.

It may be well to note in connection with this discussion that the quantity of heat conducted may not depend alone on the difference of temperatures, but has to do with the substance through which the heat is transmitted, and particularly with the surfaces of those substances. From an exhaustive series of tests M. Peclet laid down the elementary law of the transmission of heat through solids as follows: The flow of heat which traverses the element of a body in a unit of time is proportional to its surface and to the difference of temperature of the two faces perpendicular to the direction of flow, and is in the inverse ratio of the thickness of the element. This law he embodied in the formula:

$$M = (t - t') \frac{C}{E}$$

in which t and t' are the temperature of the surfaces, C the quantity of heat transmitted for one degree of difference of temperature through one unit of thickness per hour, E the thickness and M the quantity of heat passed through the metal. In other words, using English measures, if the difference in temperatures in degrees Fahrenheit be multiplied by the constant C for the given material one inch thick and divided by the thickness in inches, the quotient is the quantity of heat in English units passed through the plate per square foot each hour. Thus it will be seen that elements other than simply the difference in temperatures enter into the problem, and Prof. Rankine recognized this when he stated that in all experiments of this kind the condition of the heating surface is important, whether smooth or rough, and whether perfectly clean or encrusted to any extent.

All of the above may not seem pertinent to the real point under discussion, but enough has probably been said to indicate the nature of the mild protest I would like to make against the attack on the assumptions in the article of June 9. "X's" point is not well taken.

W.

Strength of Yellow Pine in Cars.

Columbus, O., July 8, 1899.

To the Editor of the Railroad Gazette:

Without entering into the discussion of the relative merits of pressed steel vs. composite freight cars, I desire to take exception to the statement of fact which forms the premise of the argument of Mr. Charles T. Schoen in your issue of June 30.

He quotes Trautwine as giving "the average weight of yellow pine as 55 lbs. per cubic foot." My edition (17th, page 383) gives 45 lbs., and on page 384 gives for the "unseasoned heart of long leafed Southern pine 65 lbs.," and refers to a foot note which states that "green timbers usually weigh from one-fifth to one-half more than dry, and ordinary building timber when tolerably seasoned about one-sixth more than perfectly dry." These figures computed for the 45 and 65 lb. varieties of Southern yellow pine would give from 30 to 37½ lbs. for the 45 lb. kind when "perfectly dry," and from 35 to 43½ lbs. when "tolerably seasoned," and from 44 to 54 lbs. for the 65 lb. kind when "perfectly dry," and from 51½ to 63 lbs. when "tolerably seasoned." These figures range from 30 lbs. for ordinary Southern yellow pine, "perfectly dry," to 65 lbs. for "unseasoned heart pine," and the range is so great that conclusions such as Mr. Schoen draws are hardly fair.

Let us then refer for more complete data to the United States Forestry Circulars No. 12 and No. 15, or to Prof. Johnson's tabulation of same on page 670 of his treatise on the "Materials of Construction." The average weight of kiln-dried long leaf pine is given (Circular 12, page 2) as 36 lbs. per cubic foot, and the average weight per cubic foot of 1,230 long leaf pine specimens is given at 38 lbs., with 12 per cent. moisture (page 670, Johnson's treatise). It would seem, therefore, that the yellow pine used in car construction, being at least air or yard-dried, even if it is not always kiln-dried, has an average weight of below 40 lbs. per cubic foot, and probably below 38 lbs.

As to its strength, Circular No. 12 is very explicit, and Prof. Johnson is more so. He gives 10,000 lbs. to be the average elastic fibre strength of the 1,230 pieces of long leaf pine, with 12 per cent. of moisture, tested in cross bending tests, and 12,600 lbs. for the average ultimate strength of same. Circular No. 12 gives the average bending strength at rupture for the weakest one-tenth of all the tests as 8,800 lbs. per square inch. It is furthermore shown that for the same condition of dryness the strength is directly proportional to the weight, and also that the strength of green, yard-dried, and room-dried long leaf pine are as 100 to 142 to 182.

For structural steel the elastic limit is usually placed at from 38,000 to 41,000 lbs., and its ultimate strength at 65,000 lbs., and it weighs about 490 lbs. per cubic foot.

It would therefore appear that the relative strengths at their elastic limits of long leaf pine and structural steel per pound of weight per cubic foot were as $\frac{10000}{38}$ is to $\frac{41000}{490}$ or as 263.16 is to 83.67, or as 3½ is to 1. Similarly their corresponding ultimate strengths are as $\frac{12600}{38}$ is to $\frac{65000}{490}$ or as 333½ is to 132½, or as 2.51 to 1. In order then that pine and steel shall have the same unit stress per pound of weight, it will be necessary to show some good reason why the factors of safety for the same loads similarly applied shall be from 2½ to 3½ times as great with pine as with steel; and while it may be willingly admitted that unselected, uninspected and green timber is a very uncertain material, it is not of such that freight cars should be constructed. Engineers in general, and designers and builders of railroad cars in particular, would do well to study the United States Forestry circulars and learn that we have at our command woods whose physical properties make them superior for many purposes to any of the metals at present in general use.

WM. T. MAGRUDER.

Pressed Steel vs. Composite Freight Cars—Misused Figures

New York, July 11, 1899.

To the Editor of the Railroad Gazette:

When the Canda 100,000-lb. capacity composite wood and iron car was designed, it was not anticipated that pressed steel and pressed steel car builders would be so badly hurt, as seems to be the case from Mr. Schoen's letter in the Railroad Gazette of June 30. It is true that the design is "entirely at variance with the preconceived" pressed steel opinions in regard to the relative value of a composite structure of wood and metal as compared with one built entirely of metal. Undoubtedly the "avoidance of pressed steel" in the structure wherever it was possible was a shock, but it had the best of reasons, and the production of a 100,000-lb. capacity car having a weight of but 32,000 lbs. is an answer to those who object.

To the casual reader, Mr. Schoen's letter might ap-

pear to be a plausible argument against the statement that wood is stronger than steel, weight for weight. The argument has no bearing in the case, as his reasoning is at fault; but his figures are worse than his reasoning.

He says that Trautwine gives the average weight of yellow pine, such as is used in cars, as 55 lbs. per cubic foot. That is unfair to Trautwine, for Mr. Schoen took out the specific gravity (.55) instead of the weight per cubic foot. Yellow pine does not weigh 55 lbs. per cubic foot; on the contrary, Trautwine says it weighs 34.3 lbs.* It seems too bad to smash half a column of pretty figures in this way; but such are the facts, and the argument of 20 per cent. in favor of the pressed steel car turns out to be, by his own figures, considerably in favor of the composite car.

Mr. Schoen seems to claim that a car can be built of pressed steel to carry 100,000 lbs., which will itself weigh but 26,397 lbs. This is 6,703 lbs. less than the weight of the composite car. If this is possible, why is it that the 100,000 lb. pressed steel cars, which we see, are stencilled 39,000 lbs.?

Mr. Schoen says, in the beginning of his letter, that yellow pine should not be subjected to a strain above 1,500 lbs. per square inch, and he finally assumes that it ought to be from 1,050 to 1,150 lbs. per square inch. In my composite car the wooden tension members are so proportioned that under a full load the maximum fibre stress will not exceed 1,000 lbs. per square inch. The iron tension members have a maximum fibre stress of not exceeding 15,000 lbs. per square inch. Mr. Schoen will observe that this is even less than the figures which he considers are entirely admissible. For the compression members, the ratio of smallest diameter to length governs the maximum strain allowable per square inch, in accordance with well established formulas.

There has been no mystery about the composite car. Its details, as well as its general features, were fully illustrated in the Railroad Gazette of June 9. The peculiar and novel features of construction were carefully explained, while the sizes of all the important members were given in the engravings; and, to facilitate verification, they were frequently referred to in the description, and by means of the data given, any competent engineer can verify every statement I have made.

Cars from these designs have been subjected to physical tests under excessive loads. Their behavior has confirmed the correctness of the distribution of materials. No permanent set occurred in any instance after the load was removed. I am therefore justified in emphasizing the statement that the composite car is the lightest and strongest car ever built.

The shop weight of the composite car is 33,100 lbs. It is true that it will lose some weight in seasoning, and, after a short service, will weigh less than 32,000 lbs. Mr. Schoen says that all rods and bolts will become loose in consequence. Probably he did not read carefully the description of the car. Rods and bolts in the composite car cannot become loose by the shrinkage of the timber, for the reason that all tension and compression members bear against iron and not against the side grain of the wood. The integrity of the construction cannot be affected by the shrinkage.

Mr. Schoen further says that "composite wood and metal joints cannot be connected so as to get anything near the theoretical value." The facts are these: In the composite car, the joints at the intersections of braces, posts, plates, sills and all other joints from which strains are distributed, are, by the very nature of this construction, so much stronger in their particular functions than the distributing members, that it becomes the simple mechanical question of how light can the manufacturer of malleable iron pour the metal in the shapes required to reduce to a minimum the weight of the shoes and pockets forming these joints.

When all errors of calculation have been corrected and the details of construction fairly considered on the basis of equivalents between steel and wood, it will be seen that wood gives the lightest structure for a given strength, thus fully confirming Professor Thurston's conclusions.

F. E. CANDA.

The Standard Code on the New York, New Haven & Hartford.

A new book of rules has just been put in use on all of the 20 divisions of the New York, New Haven & Hartford railroad. This code was adopted on the divisions of the Eastern District last January, but with the understanding that for a month or two the conduct of the work under the new code should be watched with special care with a view to getting out a revised code, for use on all of the lines of the company. The revision was made and the code went into use on the divisions of the Western District May 21. We have spoken of this code in our title, as

*The Division of Forestry, U. S. Government, from result of its investigations, fixes the weight of seasoned southern yellow pine, with moisture under 12%, at 38 lbs. per cubic foot.

the "Standard Code"; and it is, in general, arranged after the plan which was followed in the last revision made by the American Railway Association; but the rules have been edited, not to say altered, with great freedom; and the numbers coincide with those of the Association code only in a very few instances.

The first chapter of rules ends with No. 108. The train-order rules are Nos. 201 to 227, inclusive. Following the train-order rules and forms, come rules for enginemen (701-747); for firemen, (801-812); conductors, (850-976); and so on for all the different classes, including drawbridge tenders and lamp men.

Eight pages are devoted to the duties of railroad police officers and the statute laws of different States. Forms are given for a clearance card for fixed signals, when the signal cannot be cleared; a clearance card for train order offices; a registering blank, to be thrown off by a conductor when he does not stop at a registering station; a clearance blank, to be given to conductors and enginemen by the station agent at registering stations in the case of a train which does not stop; a notice that green signals have been taken down; and for "19" and "31" train orders.

Colored pictures are given, showing semaphore, dwarf and post signals, and lamps and flags for the head and rear of trains. Home signals are described as "red semaphores" and distant signals as "yellow semaphores." In fixed signals at night a green light indicates all-clear; and the distant, when horizontal, shows a yellow light. In post signals a red disc and a red light indicate stop, and a white disc and a green light indicate proceed. In the illustrations, showing flags and lamps on locomotives, a white light which is burning is distinguished from one which is not, by conventional rays streaming forth in all directions.

We note some of the principal features in which

and to answer any signal ahead two short blasts and one long are sounded.

The whistle is to be sounded at all whistling posts. Among the train-cord signals are: Two sounds when a train is standing, to release air brakes; and four sounds, when a train is standing, to call in a flagman. Five sounds, increase steam heat; six, increase speed.

The old rule for the arrangement of semaphore arms on posts is retained; the upper arm leading to the extreme right, the lowest to the extreme left, etc. The go-ahead indication is given by lowering the semaphore arm "at least half way" to the post. The words "home" and "distant" do not appear in these rules. The position of a red semaphore arm "may be repeated in the direction of approaching trains by means of a yellow arm with forked end."

A first-class train must not arrive at a station more than two minutes in advance of its leaving time, when no arriving time is shown. Trains of the same class must wait indefinitely at meeting points. The rule reads: "A train must not run on single track from any point until the arrival of all trains in the opposite direction of the same class which are due by time-table at or before its schedule time of leaving." The ordinary time interval between all trains running in the same direction is ten minutes. When trains of the same class meet on single track, the south or westbound train takes the siding. Inferior trains must clear superior ten minutes.

The rule concerning parting of trains requires the engineman, if he feels an application of air brakes, indicating a break in the train pipe, to shut off steam, so as to keep the two ends as near together as possible. Before the front portion is backed, care must be taken to see that the rear drawbar is in place.

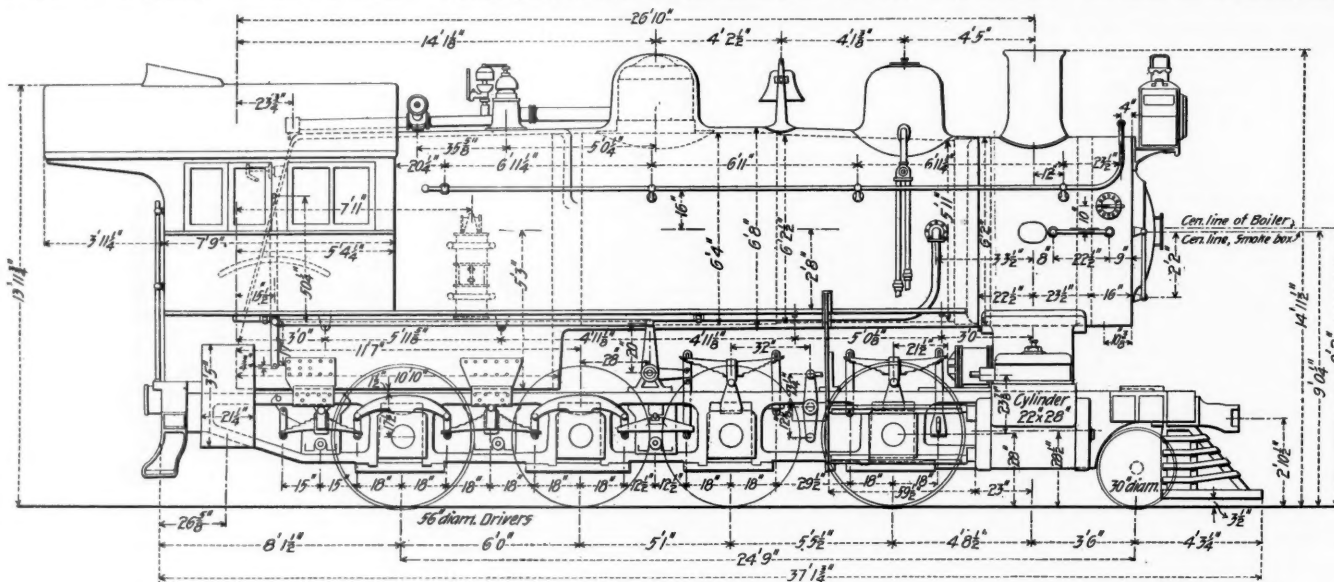
Rule 99 begins like that in the Standard Code, but a second paragraph prescribes distances on up grade

are used nearly in full, but in that of the New Haven road a considerable proportion, those which seem to be of lesser importance, are omitted. The compiler of the New Haven code has improved the phraseology of these rules in numerous instances, and has added many minor but valuable features. Not all of his changes would, however, be looked upon by everybody as improvements.

Rule 716 requires every train to stop at all registering stations whether schedule requires it or not, unless the agent gives the engineman a clearance blank (form X). The rule requiring air brake tests after attaching or detaching cars, makes exception of cases where cars are cut off from the rear of a train. More than one engine must not be used on a train, unless by special direction of the Superintendent. Engines must not stand within 100 ft. of a public crossing or under a bridge, except where it is unavoidable. Enginemen call aloud to the firemen the indications of all fixed signals as they come into view; and firemen are instructed to "carefully notice, as far as practicable," these indications, and call then aloud to the engineman. Firemen must keep a sharp lookout for signals carried by other trains, and keep in mind all train orders, so as to be prepared to correct any oversight or mistake if there should be any occasion for so doing.

The general instructions for conductors contain an excellent and comprehensive rule for notifying the coroner or other public officer when any person is killed. The rule for preserving order on passenger trains is divided into two paragraphs, one for conductors who have been authorized to act as police officers and one for those who have not been thus authorized.

Train baggage masters are to be sufficiently familiar with the conductor's duties to be able to act as conductor when required, or to assist in the collection of fares. The rules for brakemen, baggagemen,



Class H6 Consolidation Freight Locomotive—Pennsylvania Railroad.

the rules of the New Haven code differ from those of the Standard code.

The page of definitions of trains, rights, time-tables, etc., is entirely omitted. Watch certificates must be renewed and filed with the superintendent every six months. Conductors and enginemen must compare watches with a standard clock daily, "before going on duty when practicable." Where there are more trains than one to meet or pass at any point, the numbers of all the trains are shown on the schedule in the space opposite that station. The letter s is not used for "stop" in the time table, but a small x is used to indicate that a train does not stop. A fusee must be lighted and left by the flagman whenever a train is running on the time of another train; also when a flagman is acting under Rule 99, if recalled before he is able to place torpedoes the required distance.

The cuts to illustrate the lantern motions to stop and to go ahead are made to show an exactly horizontal movement for the first mentioned and exactly perpendicular for the other. "So far as possible, the extent and rapidity of these signals should indicate the manner in which the train should be stopped or moved."

Dashes of varying lengths (no small circles) are used to indicate whistle sounds; and four lengths are prescribed—one-half second, two seconds and four seconds. To release brakes, the rule requires two sounds of two seconds each. For the highway crossing signal the long sounds are to be two seconds each, and on approaching stations the length of the blast is to be four seconds.

A flagman is called in from the East or North by four long blasts and one short. On four-track sections the calling-in signal is to be preceded by one long blast (four seconds), when used for the outside tracks. A signal consisting of two short blasts, one-half second each, is an answer, when running, to any signal from the same train, except train parted;

and on down grade. When a flagman is recalled he will look and listen for any approaching train, and if none is located, take up the single torpedo nearest the train (leaving the other two), and return. If recalled before placing torpedoes the required distance, a fusee should be lighted and left on the track. If called in after the train which he is protecting has taken a siding, to allow a following train to pass, he will leave no torpedoes or fusee. Should the grade be heavy, weather bad or view likely to be cut off by smoke from passing trains, he must go as much beyond the distance named as circumstances may make necessary to safely protect his train. In flagging at night great care must be used that a green or white light does not obscure the red. The stop signal should be swung until answered by approaching train.

The train order rules make no mention of the X response. Conductors and enginemen must each sign train orders, though the Superintendent may, in special cases, make exception to the train of inferior right, when acquiring additional rights, and the exception is to be stated in the order.

There is a fixed signal at each train order office on single track, and it stands normally at clear.

The rules beginning with No. 701—those for enginemen, conductors, etc.—appear to have been based principally on those of the Cincinnati, New Orleans & Texas Pacific, which were described in the Railroad Gazette of May 28, 1897. These rules, which were compiled by Mr. C. A. Hammond for the American Railway Association, but which were never formally adopted by the Association, are very full, going into all details of the work of the different classes of employees, excepting subjects embraced in the rules for handling the air brake, those for making reports to the auditing department and such like subjects, which are generally treated in separate pamphlets, or are not put in print at all. In the code of the C., N. O. & T. P., Mr. Hammond's rules

telegraph operators and switchmen (switch tenders) state that they report to and receive their instructions from the Superintendent. Employees who have to observe signals must have their eyes and ears tested every three years.

Section foremen have charge of all flagmen and gatemen on their respective sections. They must not allow a track jack to be used either on the outside or inside of the rail, or a bar or other similar tool to be used between rails, unless fully protected as required when the track is obstructed. Handcars and track velocipedes must not be run over crossings faster than six miles an hour by day or three miles an hour by night. At crossings where a gateman or flagman is usually on duty, but is absent, the handcar must be stopped and flagged over the crossing. On double track, velocipedes must run in the direction opposite to that usually run by trains. When two or more handcars or push cars are running in the same direction they must be kept two telegraph poles apart.

The rules for lampmen require oil fonts to be emptied every two weeks and wicks to be renewed every month. Wicks must fit exactly. If a flame flickers after the lamp gets warm the cause must be looked for.

The rules for section foremen are complete, as touching all details of the foreman's responsibility, but they do not deal with the technical work of laying or repairing track. They differ much in arrangement and considerably in substance from those of the C., N. O. & T. P. The same is true in a general way of the rules for station agents and telegraph operators. The Hammond code, spoken of above, has no rules for section foremen or station agents.

We find no index or list of contents in the New Haven code; but as the superintendents themselves will be the first to feel the need of this, it is not necessary to criticize; they will, no doubt, see that the omission is supplied in issuing the next edition.

Pennsylvania Railroad Class H6 Locomotives.

About a year ago* the Railroad Gazette published details of one of the class H5 standard consolidation freight locomotives of the Pennsylvania Railroad. These engines were similar to class H4, but with some modifications and improvements over the earlier designs. The H5 locomotives were made especially for mountain service at Altoona, where the maximum power is required for a short distance only, while the H6 engine is intended for a road engine. The principal dimensions of H5 and H6 are given in the following table, while some points of

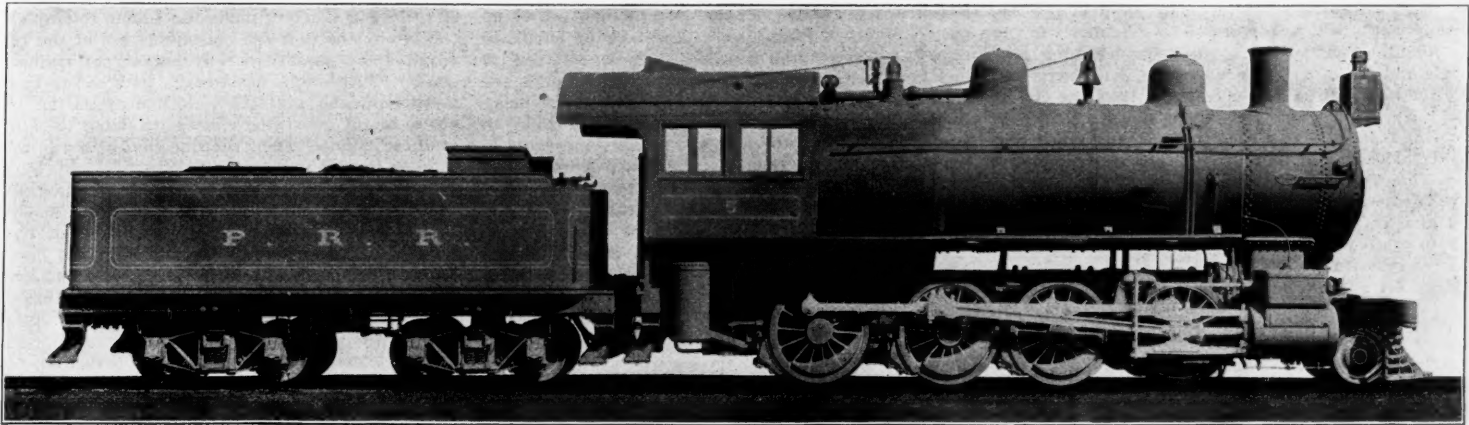
and extending across the box front and back to within half an inch of the ends of the bearing.

The driving axles are of steel with large journals. The key ways are made with cutters having a radius of 2½ in. A very slight shoulder is left, against which to bring the wheel hubs in pressing them on. The driving wheels are of cast steel and, as shown in the large outline drawing, only the front and rear ones are flanged.

The rocker box is between the first and second pairs of driving wheels. The rocker boxes for classes H4, H5 and H6 are alike. They are below the frames and filling pieces are fitted to their lower faces which bear

the Reading Division, beginning at Reading Terminal, through the subway on Pennsylvania avenue, and then from West Falls as far as Leesport, in all being 63.5 miles of double track. By its terms, the work on this contract is to be completed by December 31, 1899, by which time there will be over 211 miles of the company's lines fully protected with this system of signals, over 200 miles of it being double track.

"The operation of these signals on the Reading has proved eminently satisfactory. Their movements are accurate, prompt and remarkably free from error. Their number of failures from all causes, as compared with the total number of movements of each



Class H6 Standard Consolidation Freight Locomotive—Pennsylvania Railroad.

difference are shown more clearly in the accompanying outline drawings:

	CLASS H6.	CLASS H5.
Cylinders.....	22 in. x 28 in.	23½ in. x 28 in.
" spread.....	90 in.	90 in.
Tubes, number.....	369	369
" outside diameter.....	2 in.	2 in.
" length between sheets.....	13 ft. 4¼ in.	14 ft.
Firebox, size of inside.....	10 ft. x 40 in.	8 ft. 10 in. x 40 in.
Heating surface, tubes.....	2,652 sq. ft.	2,720 sq. ft.
" firebox.....	180 " "	197 " "
" total.....	2,832 " "	2,917 " "
Steam pressure.....	185 lbs.	185 lbs.
Weight of engine, working order.....	186,500 lbs.	198,000 lbs.
Weight on truck, working order.....	20,100 "	21,000 "
Weight on first drivers, working order.....	43,800 "	43,000 "
Weight on second drivers, working order.....	40,200 "	44,000 "
Weight on third drivers, working order.....	41,500 "	46,000 "
Weight on fourth drivers, working order.....	40,900 "	44,000 "
Tender, weight loaded.....	111,900 "	104,600 "
" coal capacity.....	22,000 "	22,000 "
" water capacity.....	6,000 gals.	6,000 gals.

No attempt will be made to outline in detail all of the new features. Reference may be made, however, to some of the more important points in their design.

The boilers are of the Belpaire type with curved crown and roof, having two cylindrical courses in front of the firebox which is placed above the frames. The water spaces are 4 in. wide all around at the mud ring and much wider above this, where the necessity for long staybolts is greater. A clear water space is left below the 2-in. tubes. The firebox is 10 ft. long x 40 in. wide, with a grate area of 33.3 sq. ft. and a heating surface of 2,812 sq. ft. It will be noted that this area is 105 sq. ft. less than that in the class H5 locomotives, but the newer type will probably not be required to develop such a high maximum power. The number and diameter of the tubes in each, however, are the same.

The boiler weighs complete 42,883 lbs., of which 11,320 lbs. is the weight of the flues. The outside sheets of the firebox are ¾ in. in thickness, which is but one-half the thickness of the barrel sheets. The crown sheet is ¾ in. and the flue sheets ½ in. thick.

The frames at the cylinders are in the form of slabs 2 in. x 31 in. in section and vertical flanges on the inside and outside of each frame form contacts for the cylinders and saddles. This part of the frames is cast steel.

The cylinders are cast separate from the saddle, which may be regarded as somewhat uncommon practice. One of the main reasons for this construction is that the shrinkage stresses which are dangerous to the life of ordinary cylinders are avoided where cylinders and saddle are in one casting. There is also an advantage in that the material for the saddle and cylinders may be selected with reference to the work each has to do.

The pistons are made with a steel center in the form of a dished single plate to which is bolted a T-shaped ring of cast iron with two packing rings.

The driving boxes are not symmetrical with reference to the journal bearings. The total length of the bearing is 13 in. and the center of the load 1 in. outside the center of the box. By this construction less weight is thrown on the inner edge of the box, where the greatest wear usually takes place. The bearings are phosphorous bronze and have no openings at the top of the journal, but have grooves ¾ in. wide situated 1¼ in. above the center of the axle

on and are secured to the lower bars and form pivots for the brake hangers. The bearing surfaces on the rocker shaft and rocker box are of phosphorousbronze in the form of sleeves ¼ in. thick cast on the shafts.

In the accompanying engraving, the first which has been published from a photograph of one of these locomotives, will be observed many of the leading points in design, which shows much good judgment and care. For many of the details of this description we are indebted to the American Engineer.

Record of Automatic Block Signals on the Reading.

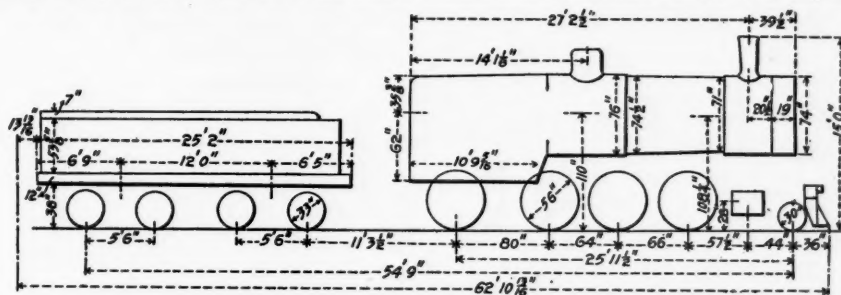
The Philadelphia & Reading announces that its main line is to be equipped with Hall automatic block signals from Philadelphia to Port Clinton, and some distance beyond, over 80 miles. A part of this has been equipped several years, as heretofore noted in the Railroad Gazette. In connection with this announcement a statement is given to the newspapers recounting what the company has done in the way of signaling during the past 36 years. The hillside

signal, does not exceed one in 30,000. This class of failures only causes a stoppage of the train till the cause can be ascertained. The failures which are entirely erroneous [which make a signal show safety when it ought to show danger] are less than one in a million movements, a far better result than can be obtained from any system of block signals dependent on human agencies. Accidents upon any portions of the lines protected by these signals are extremely rare, and can only occur through wilful disobedience of the simplest instructions on the part of employees."

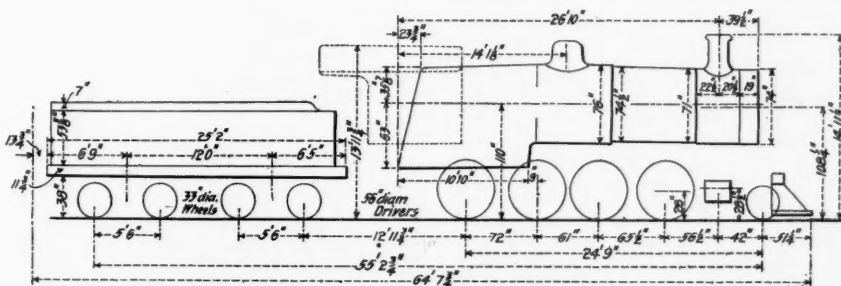
It is stated that the cost of Hall signals has been from \$1,500 to \$4,000 per mile of road.

The New Pressed Steel Car Works.

In our issue of June 10, 1898, was published an illustrated description of the works of the Schoen Pressed Steel Company, situated in Allegheny City, Pa. At that time about 1,500 men were employed and 15 finished cars a day were being turned out, in addition



Leading Dimensions of the H5 Locomotives.



Leading Dimensions of the H6 Locomotives.

towers, which are simply cabins for watchmen, who give flag signals to following trains when they are liable to run into a preceding train on a curve, were first put up in 1863, and it is stated that they were of much value in the conduct of the heavy traffic of 1876. The company began putting in automatic block signals in the spring of 1894, and made additions in the three following years. In 1896 the Atlantic City Railroad was fully equipped, 55.5 miles of double track. After describing other lines, the statement goes on: "During the present season there has been already constructed and now just ready to put in operation, signals from Bethayres, on the New York Division, as far as Trenton Junction, 17.8 miles, and a contract has now been entered into with the Hall Signal Company to complete the entire main line of

to a large quantity of pressed steel specialties. Considering that this was really a new industry developed within a few years the progress made up to a year ago seemed truly remarkable, yet now 35 cars a day are built at the Allegheny shops, instead of 15, while the output of pressed steel specialties has been correspondingly increased.

To meet the still greater demand for steel cars, an entire new plant is building at McKees Rocks on the Ohio River, almost opposite the Allegheny works, the buildings for which will cover an area probably greater than that of any plant about Pittsburgh, excepting the steel mills at Homestead. For this purpose the Pressed Steel Car Company has bought 180 acres of land. The steel framing of the new buildings is now being erected, the foundations for the heavy

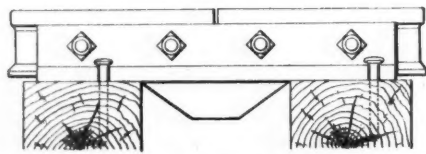
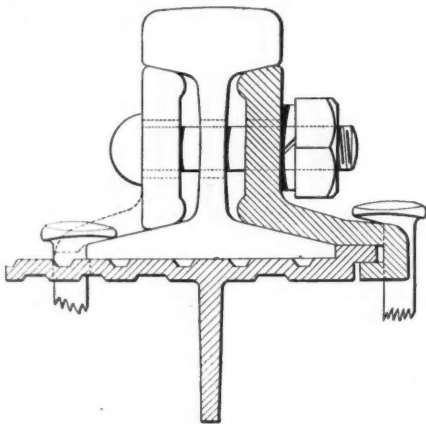
*See 1898 volume of Railroad Gazette, June 10, p. 401; July 8, p. 491; July 29, p. 541.

machinery are already completed and some of the large presses are now being installed. The main building will consist of six bays, 310 ft. long, from which two bays of similar size will extend at right angles. In addition there will be an axle and wheel shop, bolster shop, a few smaller buildings and a large power plant, including boilers, engines, electric generators and much hydraulic machinery.

Much attention has been given to the arrangement of the several buildings and the tools, and the plan adopted provides for bringing the raw materials in at one end, passing them through the several shops in regular order in such a way that they are turned out at the end as finished cars. Overhead electric cranes will be used largely throughout the shops and many operations now done by hand in the Allegheny works will be performed by machinery in the new plant. The better facilities for handling materials and the more extended use of machinery will give the new plant a larger capacity than the one at Allegheny, while employing about the same number of men. It is estimated that the new works will cost about \$1,250,000, and they are expected to be running some time in August. The two plants together will have a capacity for 80 finished steel cars a day, and will give employment to about 5,000 men. In addition to these works, the Pressed Steel Car Company will remodel its plant at Joliet, Ill., and install machinery for building steel cars there.

A New Rail Joint.

Mr. Benjamin Wolhaupter, the inventor of the Wolhaupter tie plate, has brought out a rail joint, one form of which is shown in the engraving. It will be seen that he has a corrugated or channeled base plate, and from this base plate depends a flange between the ties, all of which is designed primarily to give the joint considerable vertical stiffness. The base plate also adds to the bearing surface on the ties. It will be observed, furthermore, that one edge of the base plate interlocks with one of the angle



Wolhaupter's Rail Joint

bars, and that a shoulder is provided to receive the flange of the rail on the outer side.

Another form of joint is designed for use where people prefer a supported rather than a suspended joint. In this modified form the dependent flange is left off, and the channeling of the plate itself is made much deeper, thus building it up of a series of box girders.

It will be noticed that on the inside of the rails spikes go through holes in the base plate, the object of which arrangement is, of course, perfectly familiar to our readers.

Sewage and Civilization.

At the Cape May convention of the American Society of Civil Engineers, the following questions were offered for topical discussion:

Should Stream Contamination by the Sewage of Cities be absolutely prohibited by law?
Should the Purification of the Sewage of Cities be compulsory; and is this feasible for Large Cities?
Is Filtration the coming solution of the Pure-Water Question for Cities?

Mr. R. E. McMath, of St. Louis, introduced the subject by a remarkably clear and simple statement of the case, and we give his remarks, nearly in full, below:

The question that has been presented has not been named, and I shall not undertake to name it; but it has been subdivided into three topics. The first of these topics is: "Should stream contamination by the sewage of cities be absolutely prohibited by law?" This question may be answered in the affirmative on the ground of the common law principle, "Each must so use his own as not to injure any other." No individual can discharge filth or other

objectionable matter into a ditch or drain which traverses the field of his neighbor. If he attempt to do so the court will afford the injured party a remedy. If a city, town or village defiles a stream with sewage, the law is an already existing thing and has been applied in many cases which could be cited. . . .

Is there not a necessity for a general law which will embrace all States and will settle all questions which arise between States?

Several of the States do exert their powers to prevent contamination of streams by the cities under their jurisdiction, but there is, as yet, no statutory provision to protect against contamination by the sewage of cities in other States. If by the indifferent or mistaken policy of one State, its cities, great or small, are allowed to defile the streams, must the people of other States suffer for lack of adequate remedy? The established law I have referred to has not been enforced in many cases where the transgressor is a city, but the transgression being for a time condoned does not establish a right to transgress for all time. As the country increases in population the pollution of streams will increase and will quickly pass beyond possible toleration. As I view the matter a law more imperative than any statute should control every engineer who has to do with the sewerage plans of cities, and he should foresee and provide for the disposal of sewage eventually, if not immediately, other than by discharge in crude form into streams. Anything short of this is not worthy to be called a plan for a sewerage system.

The members of this Society are doubtless all aware that the city of Chicago has for years been preparing a channel for the discharge of sewage through its back door so that its sewage will pass the front doors of other cities, and that some of these other cities are not well pleased by the prospect, especially since the demonstration that certain diseases are water borne, and that the pathogenic bacteria are tenacious of life. The topic under discussion would be an important one if Chicago did not exist, but the Chicago case gives much emphasis to the topic at the present time, for it is a scheme to do permanently and on a large scale what everyone must admit should not be done at all—a scheme which is to-day without an avowed designer and almost without a defender.

There was a time when many believed that the water of rivers purified itself. Others firmly believed that dilution to a point beyond the reach of refined chemistry must render such matter innocuous. The Chicago scheme had its origin when these beliefs were held. The scheme involving the expenditure of more than \$30,000,000 has progressed, notwithstanding the passing of the faith upon which it was founded, and now about the only plea that is advanced for its consummation is the fact that \$28,000,000 and more has been expended upon it and it is now too late for objectors to state their objections.

This brings me to the consideration of the second topic: "Should the purification of the sewage of cities be compulsory, and is this feasible for large cities?" The answer to the first part of this proposition follows that given to the preceding topic. If streams are not to be contaminated, then such must be purified, for water is the only known vehicle that can carry the wastes of human life and industry away from our homes and shops; that such can be purified so that the effluent may be entirely unobjectionable has been demonstrated beyond occasion for further discussion. How to do it in each case that may arise is the work of engineers, to plan, execute and operate. There is no casuistry in the assertion that in this matter the end justifies the means, even when the difficulties surrounding the end require large and many means. As to the feasibility in large cities we have too many old world examples of successful solution for American engineers to hesitate as to the answer. It can be done and we are the men that can do it.

The third topic comes in to round out the discussion: "Is filtration the coming solution of the pure water question for cities?" Asked in connection with the preceding topic, the question may be taken as a suggestion that the sufferer from sewage contamination of water supply must protect himself and so relieve his upstream neighbor of his obligation. . . . So filtration may promise a remedy for defiled waters, but that does not imply that the filtered water would not be better and safer had it not been contaminated.

Ventilation of the St. Gothard Tunnel.

In 1889 a memoir was published by Mr. Bechtle, Chief Engineer, on observations of the atmosphere in the St. Gothard Tunnel for six years. His conclusions were that there was always a current of air in the tunnel; that workmen and train hands were sometimes inconvenienced, but never disabled, by pollution of the air, but that in track work it is a convenience to watch the natural current of air and to do the work at night, when only two express trains pass. In 1888 the movement through the tunnel consisted of 32 trains in 24 hours. During the night there were two intervals without trains, which aggregated eight hours and 10 minutes. In 1890 a schedule was put on, which for the first time sent

two trains through between nine o'clock in the evening and six o'clock in the morning; but by the winter of 1893 and 1894 the night trains numbered nine in all. This reduction of the intervals of freedom of trains seriously incommode the maintenance of the tunnel. For the most urgent work it was necessary to look out for days when there was a strong, natural current through the tunnel, and to suspend the movement of night trains for several nights at a time. In 1897, 61 train movements in 24 hours were made through the tunnel, and complaints came to be serious. During the autumn of that year the air pressure at either end of the tunnel was almost balanced, and there was practically no natural current through. It became necessary to reduce the number of trains, in order to make the tunnel tolerable.

It is obvious that the reasonable use of the tunnel requires the passage of any number of trains that can be got through consistently, with safety in train movement, and that the condition of the air ought not to be the governing element in fixing the number of these trains. Then the question arises how best to keep the air pure.

One natural suggestion is the use of apparatus to consume smoke, and another the use of a smokeless fuel. Smoke-burning apparatus has been tried a number of times, but the results have not been favorable. Experiments have been made and considerable studies have been carried out in the use of oil fuel, but under the local conditions this is more expensive than coal, and, what is still more important, injurious gases are given off from oil fuel as well as from coal. The temperature of the tunnel is no lower than when coal is burned, and the dampness caused by the condensation of steam is no less. Finally, the engineers come down to the conclusion that the only thing to do is to change the air in the tunnel by artificial means.

Then comes up the question of what these means shall be. One, perhaps, is that reservoirs of compressed air and oxygen shall be disposed throughout the tunnel; another is carrying in compressed air by pipes; another is the injection of a spray of water under high pressure; still another is the use of a car with a piston fixed in a tube in the track, which, moving rapidly through the tunnel, will draw out enough air to set up a current. Another solution suggested was to use the air compressors which had been used in piercing the tunnel and to introduce a large volume of air. But to make this large enough to be of any use the tubes by which it should be carried in would take up so much room that place for them could not be found inside the tunnel.

It was decided finally to try the ingenious means which have been devised by M. Saccardo, a chief inspector on the northern railroads of Italy, and which have been used in the tunnels in the Apennines. This system is patented in various European countries.

In brief, the system is to force a considerable volume of air at high speed into an annular chamber which encircles the whole circumference of the tunnel at one end. From this chamber the air escapes by a proper channel or channels on the inside face of the tunnel, and either exhausts the air in the tunnel, causing it to flow out toward the end where this compressed air is forced in, or it works the other way and forces the air out before it. In April, 1898, the directors of the St. Gothard Railroad decided upon an installation at the north end of the tunnel of ventilating apparatus of this sort.

The problem to be solved is stated as follows: To create at one end or the other of the tunnel a constant current of air with a velocity of three metres per second, flowing from north to south, acting as auxiliary to the natural current; or, in case of complete stagnation, creating a current; or if the natural current sets from south to north at less than three metres a second, reversing that current. It was decided to cause this constant current to move in the direction from north to south, because that is the direction in which the natural current of air predominates. It was decided also to put the ventilating plant at Goeschenen, at the north end of the tunnel, to push the air out rather than draw it out.

Two blowers have been established in a suitable chamber, and these are worked for the present by a locomotive run in a temporary shed. If the experiment is successful the locomotive will be replaced either by water power, transmitted by electricity or by a stationary engine, as may seem most desirable. The air is blown in through two passages, which communicate respectively with chambers which surround the tunnel at a distance of about 10 to 17 yards inside the portal. The air from these chambers is discharged into the tunnel, thus creating a pressure which causes the whole volume of air and gas in the tunnel to move toward the south portal ahead of the volume which is constantly entering.

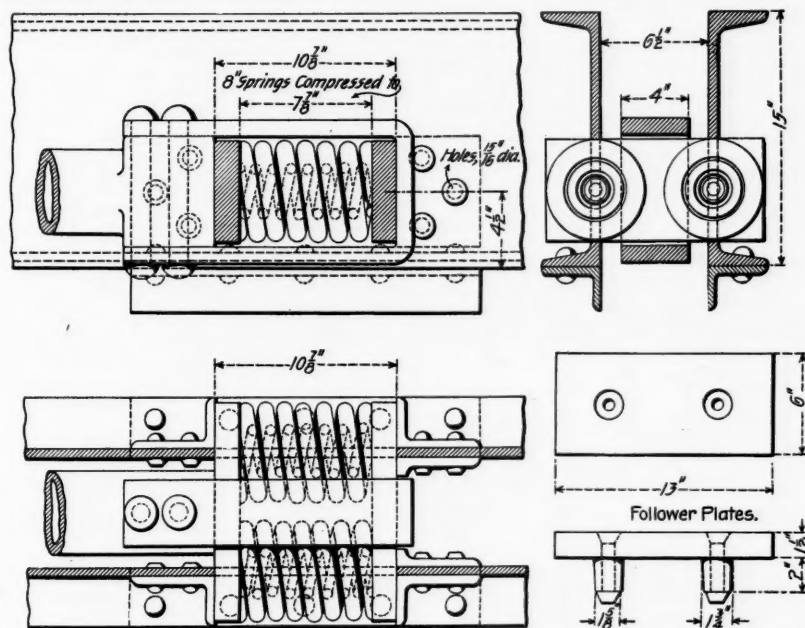
This plant began operations on the 16th of last March, and with the ventilators turning at 70 revolutions, a moderate current from south to north was immediately transformed into a current from north to south of 2.8 metres per second. From the outset the effect was entirely satisfactory, and the apparatus has continued to do its work without interruption or failure so far. It results that the work of repair and maintenance of track and of current maintenance of tunnel and all the train work are done under better conditions than ever before. The

tunnel is not only quickly cleared of smoke, but the damp and nauseous odors have disappeared. The cost of the installation, including the inventor's royalty, has been 180,000 francs. The cost of operation is not given in the report before us, which was made by Mr. Schraff, Engineer in Chief.

A New Arrangement of Draft Gear for Steel Cars.

The draft rigging is commonly considered about the weakest part of wooden cars, and it is a rather significant fact that several forms of metal draft gear were shown at the Old Point Comfort Convention, which may indicate that this detail is going to receive more attention. At the same time some who have had considerable experience with metal cars hold that the draft rigging of these cars presents possibilities for improvement; that the usual arrangement, where the follower plates engage lugs riveted to the center sills, is unsatisfactory, in that the forces are not in line with the sills, and the turning moment set up tends to break off the lugs.

To overcome this objection, Mr. J. E. Simons, Assistant Master Car Builder of the Pittsburgh & Lake Erie, has designed and patented the draft rigging for metal cars shown by the engravings. It will be seen that two double-coil springs are used, one in line with each center sill, the web of the sills being cut out to admit the springs while the flanges are left in-



A New Arrangement of Draft Gear for Steel Cars.

tact. To prevent weakening the sills, a piece of angle is riveted to the lower flange of each sill, which extends well beyond the opening on either side; this is said to more than compensate for the metal removed from the web. The pieces of angle riveted to the web of the sill form a good bearing for the follower plates, and are intended for that purpose alone. It will be seen that all rivets are subjected to shearing stresses only, and that the whole arrangement is simple and compact.

Square Bolt Heads and Nuts.

The report by Messrs. B. Haskell, W. H. Lewis and Thomas Fildes, the M. C. B. Committee on "Square Bolt Heads and Nuts," was not received in time to be included with the other reports presented at the Old Point Comfort Convention that were published in our issue of June 16.

This subject was taken up with the bolt makers, and all claimed that they would have to charge from 10 to 15 per cent. more for bolts made with M. C. B. or U. S. standard heads than for those with "Manufacturers'" heads, because of the larger amount of metal in the M. C. B. head, the extra labor required to make them and the expense for changing dies. It was also claimed that there was little call for bolts with U. S. standard heads, and that the Manufacturers' standard was equally as strong and answered all requirements. In order to determine whether or not this claim was true a comparative test of the two kinds of bolts was made for the committee by Prof. W. K. Hatt, at Purdue University.

It was the intention to test bolts made in accordance with the two standards by eight different makers, but only four makers sent bolts which could be used for comparative tests; 288 bolts in all were tested, ranging in size from $\frac{1}{4}$ to $1\frac{1}{4}$ in. in diameter and advancing by eighths. The quality of the material used by the different makers was found to vary widely, so that nearly all the bolts of one lot broke in the head and nearly all of another broke in the body. The physical characteristics of the materials were noted.

The tests were of two kinds. The first was a straight tension test, in which the bolt was let through a hole bored to an easy fit in an $8 \times 10 \times 1\frac{1}{2}$

in. steel plate, allowing the head to bear directly on top of the 100,000-lb. Olsen testing machine. The shank of the bolt was gripped in the wedges of the lower moving head of the machine, and the load was applied with a speed of 0.35 in. per minute. Failure occurred either by the bolt stretching and finally breaking in the shank, or else by the head pulling off. Two bolts of each make, diameter and standard were tested in this manner.

It was thought that any weakness at the joint between the shank and head of the bolt could be developed and made evident by a strain which would tend to open up that joint. After a trial of several methods, it was found best to use the bolt mounted as in the tension test, except, that instead of allowing the head to bear directly on the steel plate, an eccentric bearing for the head was introduced, so arranged that the shank was kept straight while the bolt head rotated. The load could thus be measured at which the head broke off without any error due to friction of the body of the bolt in the hole of the main bearing plate.

A summary of the results of all the tests showed that in the tension tests the percentage of U. S. standard bolts breaking in the body was 31.9 while that of the Manufacturers' standard was 48.7. In the eccentric tests the percentage of U. S. standard bolts breaking in the body was 19.4, against 27.7 for the Manufacturers' standard.

In the eccentric tests, when the head pulled off, the strength of the Manufacturers' head exceeded the strength of the U. S. standard head in 31 cases, while the strength of the U. S. standard head exceeded the strength of the Manufacturers' head in only 11 cases. The per cent. by which the Manufacturers' head was stronger than the U. S. standard head was uniformly greater than the same per cent. of greater strength of the U. S. standard heads compared to Manufacturers' standard heads. A comparison was worked out of both standards as referred to a common quantity, i. e., the strength of the shank of the bolt. This strength of bolt was obtained directly in those cases when the bolt broke in the body; but when no bolts of a particular diameter broke in the body, its supposed strength was computed by interpolation from measured values of the strength of those bolts nearest in diameter. In three makes of bolts out of four the Manufacturers' standard broke at a higher average per cent. of the strength of the shank of the bolt than the U. S. standard. That is, the tests showed a general average of 88.6 per cent. for the Manufacturers' standard as against 87.8 for the U. S. standard. In one case the U. S. standard broke at 88.2 per cent. as against 75.9 per cent. for the Manufacturers' standard. A general tendency was shown for an increased efficiency of bolt head as the diameter of the bolt increased.

In general, the tests, which were reported in detail, were considered to indicate that the Manufacturers' standard is a better bolt head than the larger U. S. standard.

The M. C. B. Committee recommended that the Association change its present standard square bolt head so as to make the length of the side equal to one and one-half times the diameter of the bolt and the thickness of the head one-half the length of the side. No change in the present M. C. B. standard for square nuts was recommended, as there is said to be no difficulty in getting such nuts of standard dimensions.

As noted in our issue of June 23, the recommendation of the Committee providing for a change in the dimensions of the M. C. B. standard for square bolt heads was submitted to letter ballot, as recommended practice. The Secretary was also instructed to refer

the report and recommendations to the American Society of Civil Engineers and the American Society of Mechanical Engineers, with the request that those societies consider the subject and if possible concur in the recommendations of the M. C. B. Committee.

The Hasselmann System of Preserving Wood.

The Hasselmann system of preserving wood consists in injecting certain substances into the cells of the wood and in doing this under pressure and at a high temperature. It differs from the well-known processes known as Kyanizing and Burnettizing in the material used, the use of a high temperature and of pressure. This process was devised by Mr. Hasselmann 20 years ago and has been considerably employed lately in Germany for preserving timber for the uses of railroads and of mines. The American rights for this process have been acquired by the Barschall Impregnating Co. The American company will be prepared shortly to take contracts for wood preserving. Its general offices are at No. 31 Nassau St., New York, and are in charge of A. G. Wanier.

This process has been applied on the Royal Bavarian railroads and we have before us a report by Mr. Bleibinhaus, Royal Engineer and an officer in the Royal Bavarian railroad establishment, as to the method used and the results. The plant was established at Kirchseeon, near Rosenheim.

The timber, loaded on iron cars, is run into a tank, which is sealed, and the air from which is partially exhausted by a pump. The solution then flows in, being a solution of sulphates of aluminum and of iron and copper in the proportion of one to thirty parts. Steam is then introduced, raising the temperature to some point between 100 and 140 Centigrade, causing a pressure of from one to three atmospheres. A thermometer scale permanently attached to the boiler shows the temperature. This boiling is continued two or three hours, the temperature gradually increasing, owing to the continued introduction of live steam. Under this process the preserving fluid thoroughly penetrates the timber. At the end of this first boiling the timber is withdrawn from the tanks and stands for a time before being subjected to a second treatment. This interval seems to be desirable for chemical reasons, and it also permits the use of the same solution a number of times before a change is made; in fact, eight or ten boilings are made with a given charge of the first solution. This operation of the first steeping of the timber takes in all about six hours, which covers the time of charging the timber into the boiler and withdrawing it. The object of this first steeping is to make the wood impervious to fungus growths, and the second is to harden it and make it impervious to water.

After a convenient interval the timber is again run into the tanks for a second boiling or steeping. This time the solution used consists of calcium chloride and caustic lime; otherwise it is precisely like the first operation.

The net result of the whole thing is to protect the timber thoroughly from decay; also to make it much harder than in its natural condition, and at the same time not to diminish its strength in any direction. We are told by Mr. Bleibinhaus that the elasticity of the wood is not diminished. One of the advantageous features of this process is that the wood requires no preliminary seasoning; green timber can be at once subjected to treatment. Reports upon the character of this process, made by various scientific Germans, may be seen at the office of the company.

The Uganda Railroad.

In October last Sir Guilford Molesworth was requested by the Uganda Railway Committee to inspect the works in progress for the construction of the line of railroad which will eventually connect Mombasa with the Victoria Lake, and the report dealing with this inspection has now been issued as a Foreign Office paper.

The railroad was originally projected by the Imperial British East Africa Company; but in 1895 Her Majesty's Government undertook the construction, the estimated average cost having been £3,422 per mile. Sir G. Molesworth, however, considers the estimate far too low, and points out that the average cost of the West Deccan, South Mahratta, and Holkar metre-gauge railroads, in which the physical features of the country traversed bear some resemblance to those of the Uganda Railroad, was about £7,000 per mile, and the Indian lines mentioned were not subject to many of the drawbacks which seriously affect the East African project. Indeed, it is at present premature to form any estimate of the ultimate cost and the date of the completion of the railroad to the Victoria Nyanza, for although an extremely easy line, considering the character of the country, has been obtained for ascending and descending the Kikuyu escarpment, a large, and possibly the most difficult, portion of the system, has not yet passed the stage of reconnaissance. The shortening of the line by the discovery of the route to Port Florence, in Ugowe Bay, will greatly reduce any excess beyond the estimate; but even taking this reduction into consideration, it is quite possible

that the original estimate of £1,800,000 may still be exceeded.

The temporary bridge at Macupa, connecting the island of Mombasa with the mainland, was completed in August, 1896, enabling platelaying on the island to be commenced, and at the end of January last the railhead was 270 miles from the start. The country actually traversed was in a great measure desert, and, as a rule, sparsely populated, waterless, and without resources; while a large portion of it is fatal to all transport animals. The position selected for the terminus at Kilindini, on the island of Mombasa, is reported to be eminently suitable, as there is a magnificent natural harbor, although at the time of the commencement of the railroad it was devoid of all facilities for landing stores and materials.

On the general character of the railroad, Sir G. Molesworth says that while there will be comparatively long stretches of easy work, "the great elevation that has to be attained, the sudden ascents and descents, the severity of the gradients, and the sharpness of the curves necessary to avoid expensive construction involve difficulties equal to those of a mountain railroad. These difficulties are by no means confined to any one part of the line, but affect to a great extent the easier portions as well as the more difficult. This railroad has to confront scarcity of water, enormous difficulties of transport, the unhealthy character of the climate, and the practical absence of local labor, and food supplies." From this it will be seen that the suppression of the slave trade in East Africa, the chief purpose for which the Uganda Railroad was decided upon, will not be accomplished easily or inexpensively, while the hope of the railroad ever becoming remunerative can only rest on the prospect of the gradual civilization of the dense population surrounding the Lake district. Still, it has to be remembered that the expenditure upon the squadron, which is at present engaged in suppressing the slave trade, is estimated at from £108,000 to £110,000 per annum, including bounties, which represents the interest on a capitalized sum of rather more than £3,000,000, at 3 per cent.; so that, as Sir G. Molesworth suggests, "the subsidy for the railway is almost justified by the saving in the annual expenditure on the suppression of slavery, even apart from the development of trade and civilization of the country."

It is satisfactory to find that the civilizing influence of the railroad is most marked, even on the unpromising region which it has hitherto traversed. The tribes in contact with it have already commenced to trade, and a demand for European goods is springing up among them; traders are beginning to settle round the different stations, and at Voi there is quite a flourishing bazaar.

Sir G. Molesworth expresses the opinion that the rate of construction has, on the whole, been maintained in a manner highly creditable to the chief engineer and the officers concerned, the surveying and setting out of the line having been especially excellent, while the system of working is described as being characterized by the utmost method and careful consideration of detail.—The Economist.

Piston Valve of the Chicago, Burlington & Quincy.

It is now pretty well understood that it does not follow because a locomotive valve may be of the piston type that it is perfectly balanced, or that it takes less power to move it than to move some flat, balanced slide valves. Probably it is unnecessary to add that the chief difficulty with piston valves arises from the steam getting back of the packing rings and setting them out, and that most of the improvements recently made in such valves have been with a view to prevent the steam from getting back of these rings. In this connection the piston valves illustrated by the accompanying engravings and used with some of the Class H mogul locomotives of the Chicago, Burlington & Quincy are interesting as showing a recent design that has given good service.

These engines have cylinders 19 x 26 in., a maximum valve travel of 6 in., steam lap 1 in. and a clearance of $\frac{1}{4}$ in. on the exhaust side. The valve seats consist of two bushings 14 $\frac{1}{2}$ in. long, one near either end of the cylinder, which arrangement reduces considerably the length of the steam passages. To facilitate taking the valve in and out the bushings are made 10 in. inside diameter through such a distance as the valve travels, but are tapered near the ends to a diameter of 10 $\frac{1}{4}$ in. The live steam is admitted at the middle around the outside of the valve and the exhaust passes out at the ends of the valve chamber.

It will be seen that the packing rings are brought out flush with the ends of the valve proper, thus determining the valve proportions; and are held in place by follower plates bolted to the ends of the valve. The rings are made in three pieces. Those marked 1 and 2 are turned $\frac{1}{8}$ in. larger than the bore of the bushing, a piece $\frac{1}{8}$ in. long is cut out, then the ends are clamped together and trued up to be 10 in. in diameter. Ring 3 is carefully fitted so as to have a steam tight joint at the sides marked A and B. In this way the packing rings present a broad wear-

ing surface with little chance for steam to get behind the rings.

The first valves of this design were used in two Class H locomotives built at the company's shops last summer, and so far there has been no appreciable wear of either the valves or the bushings, in which time flat side valves of engines of the same class have been faced off two and three times. Sixteen similar mogul locomotives now building will also have piston valves of the design shown.

Railroad Legislation in Michigan.

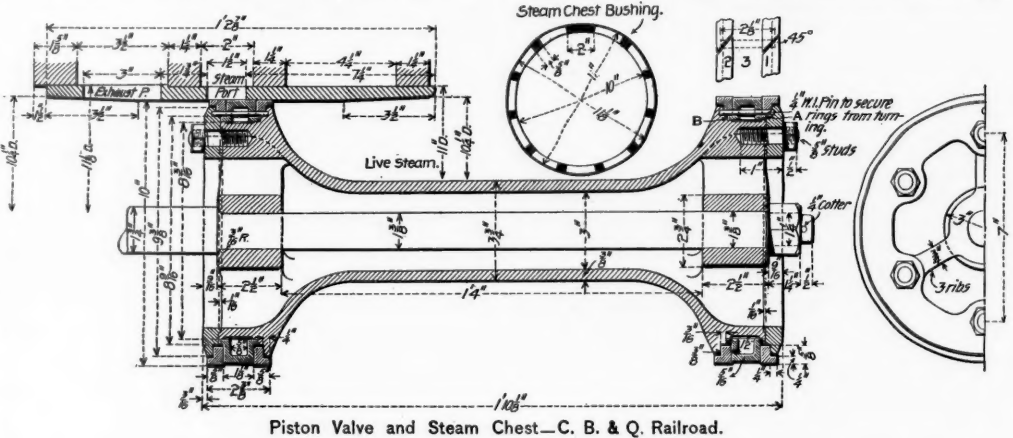
The Legislature of Michigan, at its session recently closed, passed nine general laws affecting railroads and street railroads.

The first law passed was an Act to provide for the assessment of taxes on the property of railroad, express, telegraph and telephone companies by a board of three State assessors, but in an action brought in the Supreme Court, to test the principle involved in this law, it was declared invalid.

An Act was passed to provide for a commission to negotiate with all railroad companies having special charters, to see on what terms such companies will surrender their charters and re-incorporate under the general railroad laws of the State. The roads interested are the Michigan Central, the Lake Shore & Michigan Southern and the Detroit, Grand Haven & Milwaukee.

An Act to provide for prior liens stipulates that all claims for labor, after having been properly presented to the officers of railroad companies or street railroad companies, shall become a lien prior to any and all judgments and attachments existing by reason of any other debt; also that claims arising out of the death or personal injury of any person shall, after a judgment has been secured for the same, become a prior lien against the property of the company.

The general railroad law was amended so as to



damaging the engine and several cars. The engine-man, fireman and another person riding on the engine, and a tramp riding on the baggage car, were injured, the latter fatally.

27th, on Chicago Great Western, at Bee Creek Junction, Mo., passenger train No. 1 ran into the rear of a preceding freight train of the St. Louis & Grand Island; two trainmen injured.

30th, on Lake Street Elevated, near Oakley avenue, Chicago, an eastbound train, standing at the station, was run into at the rear by a following train, damaging several cars and injuring about 40 passengers, most of them not very seriously. It is said that the motorman of the second train lost control of his motor.

And 27 others on 21 roads, involving 3 passenger and 38 freight and other trains.

Butting.

9th, on Norfolk & Western, on the bridge over the Ohio River at Kenova, W. Va., butting collision between a freight train and a switching engine, derailing both engines. One fireman was injured.

15th, on Southern Railway, at Waring, Ga., butting collision between a northbound passenger and a southbound freight, the latter drawn by two engines. The passenger train had nearly stopped before the collision occurred. All of the engines and several freight cars were wrecked. One engine-man and one fireman were killed and three passengers were injured. It is said that the freight train ran past a meeting point.

17th, on Georgia & Alabama, near Hurtsboro, Ala., butting collision of freight trains, badly damaging both engines and eight cars. Both engine-men were injured. It is said that the eastbound train, an extra, had encroached on the time of the westbound.

19th, on Illinois Central, near Rantoul, Ill., butting collision of freight trains, badly damaging both engines and 12 cars. One engine-man, one fireman and one passenger were injured.

28th, on Pittsburgh & Western, near Glenshaw, Pa., butting collision of freight trains, wrecking both engines. Two trainmen and three tramps were injured. It is said that an operator failed to hold the westbound train.

30th, on Louisville & Nashville, near Thompson, Tenn., butting collision of passenger trains, wrecking both engines and two baggage cars. Both engine-men and several passengers were injured.

31st, on Cleveland, Lorain & Wheeling, near Lorain, O., butting collision of freight trains, badly damaging both engines. One fireman was injured.

Crossing and Miscellaneous.

2d, 2 a. m., on Chicago & Northwestern, at Oneida street, Milwaukee, Wis., collision between a freight train and a switching engine, badly damaging both engines. The engine-man of the switching engine was killed. It is said that the freight disregarded a signal which had been set against it.

26th, 10 p. m., on Chicago & Northwestern, at Peshigo, Wis., collision between a passenger train and a switching engine, due to a misplaced switch. One engine-man and one fireman were injured.

27th, 8 p. m., near Janesville, Wis., a freight train of the Chicago, Milwaukee & St. Paul ran into a passenger train of the Chicago & Northwestern at the crossing of the two roads. The smoking car was badly damaged and the freight engine was wrecked. The conductor of the passenger train was injured.

31st, on Chicago & Northwestern, at Desplaines, Ill., collision between a passenger train and a freight; a tramp was killed and four trainmen were injured.

And 17 others on 16 roads, involving 1 passenger train and 31 freight and other trains.

DERAILMENTS.

Derailments; Defects of Roadway.

8th, on Great Northern, near Saunders, Wis., a freight train broke through a high trestle bridge and the engine and 40 cars of iron ore fell to the ravine below. Of the bridge, 1,200 ft. long, only 300 ft. was left standing. The engine-man was killed and the fireman was fatally injured.

22d, on Ilwaco Railroad & Navigation Company's road, at Ilwaco, Or., a mixed train broke through a trestle bridge and the engine fell into the water. The passenger car, containing 10 passengers, lodged in the piling above the water line. Five passengers, the engine-man and the fireman were thrown into the water, but were not severely injured.

25th, on Southern Pacific, near Cheneyville, La., a freight train was derailed by spreading of rails; two trainmen injured.

26th, on Norfolk & Western, near Canterbury, W. Va., a passenger train was derailed by a defective switch and one passenger car was overturned. Four passengers were injured, one of them fatally.

26th, on Northern Alabama, at Haleyville, Ala., a passenger train was derailed at a switch and one passenger car was overturned. Four passengers were injured.

29th, on Chicago & Northwestern, near Otis, Ia., a freight train broke through a bridge which had been undermined by high water, and several cars were submerged. Two tramps were killed and 160 head of cattle were drowned.

And 2 others on 2 roads, involving 1 passenger train and 1 freight.

Defects of Equipment.

4th, on Cleveland, Cincinnati, Chicago & St. Louis, at Marion, O., a car loaded with corn in the middle of a freight train was crushed by the sudden stopping of the train in consequence of the rupture of the air brake hose between the first and second locomotives.

7th, on Delaware & Hudson, near Afton, N. Y., a freight train was derailed by a broken wheel and nine cars of coal were wrecked and fell down a bank. A tramp was injured.

8th, on Norfolk & Western, at Lynchburg, Va., a freight train drawn by two engines broke in two behind the first engine and the automatic application of the air brakes stopped the front cars so suddenly that four cars in the middle of the train were knocked off the track and fell down a bank.

23d, on Brooklyn Elevated, near Vanderbilt avenue, Brooklyn, N. Y., a car of a passenger train was derailed by a part of the engine which had been broken and had fallen upon the track, and one truck fell to the street below, lodging on a street car track about three seconds after a car loaded with passengers had passed the spot. The breakage of the engine was due to the blowing out of a cylinder head and the subsequent breaking of a connecting rod.

24th, 1 a. m., on Lehigh Valley, at Allentown, Pa.,

a freight train was derailed by a brake rod which was broken and fell upon the track, and several cars were thrown in front of a freight train which at the same moment came along on the adjoining track. The collision of this train with the derailed cars was followed by an explosion in one of the freight cars and four trainmen were somewhat burned.

28th, 11 p. m., on Central of Georgia, near Juniper, Ga., a freight train was derailed on a trestle, presumably by a loose wheel, and 13 cars were wrecked. One brakeman was killed and another injured.

And 20 others on 13 roads, involving 20 freight and other trains.

Negligence in Operating.

13th, on New York Central & Hudson River, at East Rome, N. Y., the two rear cars of a long westbound freight train were derailed and overturned in consequence of the too sudden application of the air brakes by the engine-man, who was unexpectedly stopped by a flag signal.

22d, on Louisville, Evansville & St. Louis, near Huntingburg, Ind., a passenger train moving slowly across a bridge which was undergoing repairs was derailed by the track moving out of place, some of the blocking under it having slipped from its position.

25th, at the Union Station, Columbus, O., a car in an eastbound freight train of the Baltimore & Ohio was crushed by the too sudden application of the air brakes, and fell through the brick wall of the side of the passenger station, fouling track No. 8.

25th, on New Orleans & Northeastern, at Enterprise, Miss., a freight train was derailed at a misplaced switch and the caboose and two cars of cattle were ditched. One brakeman and one stockman were injured.

25th, on Iowa Central, near Oscaloosa, Ia., a freight train was derailed at a point where the track was being repaired and the engine and five cars were ditched. A brakeman was fatally injured. It is said that two gangs of men were at work on the track

a water spout, and the entire train was wrecked. One brakeman was fatally scalded.

27th, on Chicago, Milwaukee & St. Paul, near Wabasha, Minn., a passenger train was derailed by a landslide, and two trainmen were injured.

27th, on Northern Pacific, near Mandan, N. D., passenger train No. 1 was derailed and several cars were ditched and partly submerged in a river. Rain had been falling heavily and the train was running slowly, but the roadbed had been considerably softened. A tramp was killed and seven passengers were slightly injured.

28th, 1 a. m., on Burlington, Cedar Rapids & Northern, near Waterloo, Ia., a northbound passenger train was derailed by a washout and the entire train, except one sleeping car, was wrecked. The conductor, the sleeping car conductor and five passengers were killed and 40 passengers were injured. There was a heavy downpour of rain at the time of the accident and help was not secured for two or three hours. It is said that the flood was due to a cloudburst, which washed the ballast away from the ties for half a mile.

And 1 other, involving 1 passenger train.

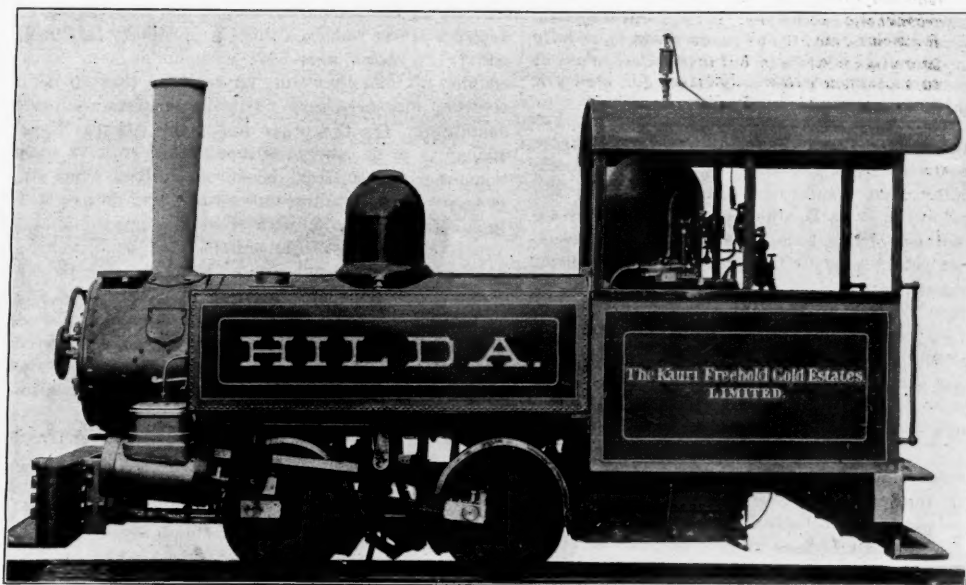
Unexplained.

5th, on Baltimore & Ohio Southwestern, near Bedford, Ind., a passenger train was derailed and the engine was overturned. The fireman was killed and the engine-man was injured.

13th, on Southern Pacific, near Riddle, Or., a freight train was derailed and the engine and five cars fell down a bank and were wrecked. The engine-man and two tramps were killed and the fireman was injured.

15th, on Southern Railway, near Muscadine, Ala., a local freight train was derailed and one brakeman was killed. The fireman was injured and several passengers in the caboose were badly shaken up.

28th, 2 a. m., on Chicago Great Western, near Oelwein, Ia., a passenger train was derailed and the



A Light Locomotive for New Zealand. Built by the H. K. Porter Co., Pittsburgh, Pa.

and that the second one depended upon the stop signal which had been put out by the first, but through a misunderstanding the signal was taken in before the second gang had made its track safe.

28th, 2 a. m., on Pittsburgh & Western, near Tunnel No. 3, a freight train was derailed by a misplaced switch and several cars of cattle and ore were wrecked. The engine was ditched and the engine-man was injured.

31st, 3 a. m., on Boston & Maine, in the tunnel at Salem, Mass., three cars of a freight train were derailed in consequence of a high load of cedar posts on one of the cars striking the roof of the tunnel.

31st, on Manhattan Elevated road, Third Avenue Line, near 96th street, New York City, a train of empty cars, being pushed into a side track, were allowed to run too fast, and one car ran over the buffer post at the end and fell to the street below.

And 14 others on 12 roads, involving 1 passenger train and 13 freight and other trains.

Unforeseen Obstructions.

14th, on Missouri Pacific, near Garrett, Mo., a freight train was derailed by running over a pony, and the engine and several cars were wrecked. All of the front portion of the train fell down a bank and the boiler of the engine exploded. The wreck took fire and the combustible portion of it was mostly burned up. The fireman was killed and the engine-man and one brakeman were injured.

16th, on Philadelphia & Reading, at Zehners, Pa., a passenger train was derailed by a spike which had been laid on the track, and the engine ran into the cars of a coal train which was passing at the time on the adjoining track. Both engines and several freight cars were badly damaged. The engine-man of the passenger train was killed and the fireman was fatally injured. The fireman of the freight and several passengers were also injured. The spike had been placed on the rail by a boy, who took that way to flatten it. The boy was arrested, and in his explanation said that a farmer near the line knew what he intended to do and made no remonstrance.

16th, on Delaware Railroad, at Dupont, Del., a passenger train was derailed by a tree which had been blown down, and four passengers were injured.

21st, on St. Louis, Iron Mountain & Southern, near Tip Top, Mo., a passenger train was derailed by running over a cow, and the engine was overturned. The fireman was killed and the engine-man was injured.

26th, on Pecos Valley & Northern Texas, near Canyon City, Tex., a mixed train was derailed at a culvert which had been washed out by a flood following

engine and several cars were badly damaged. The sleeping car porter was killed.

28th, on Texas & Pacific, near Whitesboro, Tex., a freight train was derailed and the engine and seven cars were wrecked. The engine-man was killed and the fireman fatally injured.

28th, on St. Louis, Peoria & Northern, near Green Valley, Ill., a passenger train was derailed and one passenger car was overturned. Two passengers were injured.

31st, on Sierra Railway, near Paulsell, Cal., a freight car in a mixed train was derailed and fell down a bank, and, with two passenger cars, was overturned. Twelve passengers were injured.

And 36 others, on 28 roads, involving 2 passenger and 34 freight and other trains.

OTHER ACCIDENTS.

13th, on Wabash road, at Centralia, Mo., the locomotive of a passenger train was wrecked by the explosion of its boiler, while it was standing at the station.

21st, on Philadelphia & Reading, at Longsdorf, Pa., the locomotive of a freight train was damaged by the explosion of its boiler, and two employees were injured.

28th, on Missouri, Kansas & Texas, near Caddo, I. T., all of the windows in one side of a passenger train were broken out by hail.

29th, on Missouri, Kansas & Texas, at Aubrey, Tex., the locomotive of a freight train was wrecked by the explosion of its boiler; engine-man and fireman badly injured.

And 4 others on 4 roads, involving 2 passenger and 2 freight trains.

A summary will be found in another column.

A Light Locomotive for New Zealand

The accompanying engraving shows a light locomotive recently built by the H. K. Porter Co., Pittsburgh, Pa., for the Kauri Freehold Gold Estates, Ltd., Auckland, New Zealand. As shown, it is of the fourwheel type, the driving wheels being 26 in. in diameter, the cylinders 8x14 in. and the wheel base 4 ft. The gage is 24 in. and the weight is 21,000 lbs. Two side tanks are used instead of the usual saddle tank and the boiler carries a working steam pressure of 140 lbs. per sq. in.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.

At the Master Car Builders' Convention a report was received from a committee on square bolt heads and nuts. That committee recommended certain changes in the M. C. B. standard, as recorded in another column of this issue. The Association directed its Secretary to bring this matter to the attention of the American Society of Civil Engineers and the American Society of Mechanical Engineers, to the end of getting concerted action. We write this simply to remind members of the two great engineering societies that such action has been taken, hoping that some of those members will be interested and will urge the appointment of a joint committee.

The statement of the Philadelphia & Reading concerning the automatic block signals on that road, which we give in another column, is notable as being the first formal utterance from a railroad company in which automatic and non-automatic block signals are compared in definite terms. At all events we cannot recall anything of the kind before this. The present statement is noteworthy also for giving information as to the degree of perfection which has been attained in working these signals. We do not know to what extent this statement of the Reading is based on precise figures as to failures in non-automatic working, but the figures will afford a datum for future comparisons. The statement shows that the Reading continued its expenditures for new signals right through the hard times. This gives evidence of the enlightened spirit actuating the officers; and the very heavy traffic on some of the company's lines gives assurance that the percentage of failure shown in the statement (non-dangerous failures 1 in 30,000; others 1 in 1,000,000) are deduced from experience of the severest kind; and this experience has now extended over a period of five years. For the first few miles out of the Market Street terminal the two main tracks of the Reading are probably traversed by as many trains in a given time as any tracks in the world, excepting, of course, such lines as the Manhattan elevated, where all trains are run with speed always under control. Most large terminals, which one would naturally compare with Market Street, have four tracks, but this has only two.

Some Fundamentals of American Bridge Building.

Our issue of June 30th contained a brief editorial on the Atbara River Bridge, with especial reference to erecting, but the matter has attracted so much attention in the foreign press that it seems expedient to say a little more.

The first and perhaps the most striking feature of the case is the comparative insignificance of the work. The Atbara River Bridge consists of seven spans of 150 feet each between center of piers; it carries a single narrow gauge track, and is proportioned for a light moving load. The total structure weighs about 500 long tons and represents about two week's work of a second class bridge shop, and only three

or four days capacity of the shop at Pencoyd. In fact, this bridge formed such an insignificant addition to the work of that shop that many people connected with the shop did not know of its existence. And yet, as one of the English papers has said, no bridge since the days of the Forth Bridge has attracted so much attention in England.

This attention was due to the fact that the contract for this piece of work, really built by the British Government, was given to an American firm and that American firm was able to carry through this work in a time which no English maker would attempt. The speed, however, was nothing very extraordinary. Nearly 25 years ago a double-track, four-span bridge on the main line of the Erie Railroad, weighing approximately twice as much as the Atbara Bridge, was destroyed by an ice gorge, and replaced with a permanent iron structure in 40 days. All the plans were made after the destruction of the old bridge, and all of the material was rolled after the plans were made. There are other similar feats recorded in the history of American bridge building.

The question before the English now is why Americans can do this work so quickly. The first reason assigned is that the American system of pin construction permits quick erecting. This is true; in the bridge across the Ohio River at Cairo a span of 518 feet, weighing about double the whole Atbara Bridge, was erected so as to be self-sustaining in three days, and a span of 400 feet, weighing as much as the whole Atbara Bridge, in two days. These spans were erected on false work and their pin-connected features rendered this extraordinary feat possible; the spans were safe as soon as they were coupled up, and they were so designed that no field riveting was necessary until the spans were self-sustaining. On the other hand, the Atbara River Bridge is to be erected without false work in such a manner that no real benefit is derived from pin connections. Both top and bottom chords are stiff members throughout, with riveted connections, and the rivets in these connections must be driven as the erection proceeds. Pins are used only in the connections between the web members and the chords, and to rivet these connections would probably not have added six hours to the time required for raising a span. Any time advantage which the American builders have must be looked for elsewhere.

The real difference between the Americans and the English is to be found in their methods of handling their work. Every American bridge shop has its own standards which it follows. Every designing bridge engineer has his standards. Formerly nearly all designs for bridge superstructures were made by the bridge building firms; now a very large portion of them are made by engineers employed by railroads; but both follow the same general principle; they have their own standards from which they work. When a new structure is to be built its principal dimensions are given and the plan is made; this plan being simply the adaptation of a regular standard to the case in hand. With two bridges of exactly the same length and on the same railroad but one set of plans would be made; with spans of different lengths the panels would generally be made exactly uniform, so that there would be no variations except in the trusses. In this way the work of the drawing room is reduced to a minimum and the shops know exactly what kind of work they are to expect and have provided the proper tools.

Contrast this with the practice on the Manchester Ship Canal. The draw bridges for the crossings of this canal were built in the shops of Sir William Arrol at Glasgow and there are no two alike. Under conditions in which practical uniformity would have been obtained in American practice, English practice selected the greatest possible variety.

The practice of American and the practice of European bridge engineers have been approaching each other for the last thirty years. American engineers started with cast-iron compression members, eye-bars or rods for tension members, pin connections and adjustments. European engineers, after passing the stage of cast-iron girders and cast-iron arches, adopted boiler plate and lattice construction. American engineers long ago substituted riveted wrought-iron members for cast-iron, and, beginning with plate girders for short spans, have gradually worked up to lengths of over 100 feet. European engineers, while they have generally retained riveted connections, have largely adopted the American practice of concentrating the material into comparatively few principal members. In all good bridges there has been a tendency towards increased rigidity; the only real objections to pin-connected structures are from this need, and they can be eliminated by a proper attention to details.

The elongation of pin holes and the bending of pins, which have been alleged as objections, practically do not exist, and this in spite of many old bridges in which these details were proportioned in a way which would be absolutely condemned in modern practice. In the older bridges built by the Keystone Bridge Company, all of which gave good service, the diameters of the pins are less than one-half the width of the bars and the pins were generally rough rolled iron, the closeness of fit in the pin holes being principally due to the paint on the pins. In many bridges, among them the one recently taken down at Rock Island, the unsupported lengths of the pins outside of the posts were very large, but these pins, though they would be condemned by modern regulations, when taken out are found to be straight. The wear which is found on pins is generally where the lighter counters attach to them. These rods theoretically carry no strain; their principal duty is to rattle and this rattling has produced wear; in more modern bridges they are omitted.

While American engineers are generally giving up the use of pin connections for short spans they retain them for bridges of large dimensions. Perhaps no better illustration of this can be given than the fact that the new double track superstructure which has replaced Robert Stephenson's riveted tubular superstructure in the Victoria Bridge at Montreal, is a pin-connected structure with eye bars in the bottom chord.

The American practice of working by standards is not peculiar to bridge shops; it is found in every branch of metal work and of other manufactures. It is followed in shop practice by mechanical methods for handling material as well as performing work, and these mechanical methods are largely possible because of the practice of following standards. While these standards may not do as much as many people would suppose in cheapening the cost of the product, they save an enormous amount of time.

May Accidents.

Our record of train accidents in May, given in this number, includes 65 collisions, 108 derailments and 8 other accidents, a total of 181 accidents, in which 64 persons were killed and 208 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:
COLLISIONS.

	Rear.	But-ting.	Cross-ing and other.	Total.
Trains breaking in two.....	11	0	0	11
Misplaced switch.....	4	0	2	6
Failure to give or observe signal.....	6	0	1	7
Mistake in giving or understanding orders.....	0	4	0	4
Miscellaneous.....	3	0	6	9
Unexplained.....	13	3	12	28
Total.....	37	7	21	65

DERAILMENTS.

Broken rail.....	1	Careless running.....	1
Loose or spread rail.....	2	Track repairers.....	3
Defective bridge.....	3	Bad switching.....	3
Defective switch.....	2	Bad loading.....	2
Broken wheel.....	4	Too quick applying air brakes.....	2
Broken axle.....	11	Derailing switch.....	2
Broken truck.....	2	Animals on track.....	2
Broken car.....	2	Landslide.....	2
Loose wheel.....	1	Washout.....	3
Broken brake rod.....	1	Malicious obstruction.....	1
Broken engine.....	1	Accidental obstruction.....	1
Failure of drawbar.....	1	Unexplained.....	43
Failure of coupling and automatic application brakes.....	1		
Failure brake hose.....	2		
Misplaced switch.....	8		
			108

OTHER ACCIDENTS.

Boiler explosion.....	3
Broken side rod.....	3
Breakages of rolling stock.....	1
Other causes.....	1
	8

Total number of accidents..... 181

A general classification shows:

	Colli-sions.	Derail-ments.	Other acci-d's.	Total.	P. c.
Defects of road.....	0	8	0	8	5
Defects of equipment.....	11	26	7	44	25
Negligence in operating.....	26	22	0	48	27
Unforeseen obstructions.....	0	9	1	10	6
Unexplained.....	28	43	0	71	37
Total.....	65	108	8	181	100

The number of trains involved is as follows:

	Colli-sions.	Derail-ments.	Other acci-d's.	Total.
Passenger.....	18	20	4	42
Freight and other.....	94	89	4	187
Total.....	112	109	8	229

The casualties may be divided as follows:

	Colli-sions.	Derail-ments.	Other acci-d's.	Total.
Killed.				
Employees.....	4	18	0	22
Passengers.....	29	6	0	35
Others.....	2	5	0	7
Total.....	35	29	0	64
Injured.				
Employees.....	32	24	4	60
Passengers.....	70	72	0	142
Others.....	5	1	0	6
Total.....	107	97	4	208

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. Killed.	Pass. Injured.	Emp. Killed.	Emp. Injured.
Defects of road.....	1	12	2	4
Defects of equipment.....	0	0	1	9
Negligence in operating.....	29	71	5	34
Unforeseen obstructions and maliciousness.....	5	47	8	9
Unexplained.....	0	12	6	4
Total.....	35	142	22	60

Twenty-one accidents caused the death of one or more persons each, and 29 caused injury but not death, leaving 131 (72 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with May of the previous five years shows:

	1899.	1898.	1897.	1896.	1895.	1894.
Collisions.....	65	63	33	34	47	42
Derailments.....	108	76	46	73	58	54
Other accidents.....	8	6	8	2	6	4
Total accidents.....	181	150	87	109	111	100
Employees killed.....	22	28	11	17	16	30
Others killed.....	42	8	5	15	9	4
Employees injured.....	60	78	17	39	62	70
Others injured.....	148	60	48	37	65	41
Passenger trains involved	42	39	27	25	34	41

Average per day:						
Accidents.....	5.84	4.84	2.80	3.52	3.58	3.23
Killed.....	2.06	1.16	0.84	1.03	0.81	1.10
Injured.....	6.07	0.45	2.10	2.45	4.10	3.58

Average per accident:						
Killed.....	0.35	0.24	0.18	0.29	0.22	0.31
Injured.....	1.15	0.92	0.74	0.70	1.14	1.14

The record of passengers killed in May is in larger figures than we have had to record before since July, 1896, (Atlantic City and Logan). In October, 1897, which included the Garrison disaster, 24 passengers were killed, but aside from that the monthly total for nearly three years has been below a dozen, except in three cases; and in no month has it reached half that now recorded. The principal accident in our present record was reported quite fully in our issues of May 19 and June 2. The only information that we have in addition to that which was then given is to the effect that the man in the tower a mile or so north of Exeter, did not take, nor does it seem that he was expected to take, particular care to maintain an interval of time between the two trains, but only aimed to warn the second train of any unusual detention to the first. The report of this signalman's testimony indicates that he saw the tail light of the first train disappear from his view, and thereafter deemed it proper to give, and did give, the second train an all-clear signal. This signalman was in a cabin on high ground, 80 ft. above the track, and it appears that the cabin is thus located, not as a distant signal for Exeter station, but to enable the attendant to watch the curve. The station is not within his view. These being the facts, the explanation of the collision is much simplified.

(1) The time interval was only five minutes; (2) the first section used up a part of this in setting back at Exeter; (3) the testimony as to the number of minutes used up is conflicting, but appears to show that it was less than five, so that (4) the second train must have run faster than the first. (5) There was no specific time-interval notice to the second section after it left Reading, though a caution signal was shown at a tower a short distance south of Reading and the engineman did slacken his speed there; but evidently so little that he soon shortened the interval more than he had lengthened it.

Whether the second section ran faster than the schedule rate of speed is, very likely, a question too difficult to settle with accuracy. It is nearly always difficult to secure testimony from two or more sources which will agree, as to the time of a given occurrence, within a minute or two minutes. This being so, it may very likely be impossible to fix the degree of blame with which the engineman of the second train is chargeable. The obvious conclusion from this is that the only safe rule for running under the time-interval in such circumstances as those of this case, is for the second train to run slower than the schedule. How much slower? Obviously, under perfect control—that is, with the responsibility resting wholly on the second train—until the time-interval has been lengthened enough to give the flagman of the foremost train all the time that he may need, under the most adverse circumstances. How much shall this time be? As we suggested in discussing this matter before (June 2), the distance between stations is an important element in answering this question. It cannot be said, absolutely, that five minutes is too short an interval for safety, if the places at which the interval can be corrected are close enough together. Moreover, the five-minute rule has been in force on the Pennsylvania and the New York Central for several years; and it is in use on the Delaware & Hudson. The Pennsylvania and the New York Central use the block system on their principal lines, but the time-interval governs multitudes of trains on their minor lines every day, nevertheless. In other recent codes that we have examined the time interval appears as follows: Boston & Albany, Chesapeake & Ohio, New York, New Haven & Hartford, Norfolk & Western and Southern Pacific, 10 minutes for all trains. Cincinnati, New Orleans & Texas Pacific, 10 minutes for passenger trains and for freights 10 minutes by day and 15 minutes by night. Erie, 10 for passenger and five for freight. Baltimore & Ohio, 10 for passenger and seven for freight.

After Exeter the next most serious passenger train accident in May was that near Waterloo, Ia., in which seven persons were killed. It will be noticed that there were three accidents on elevated roads in May, one in Brooklyn, one in Chicago and one in Manhattan. None of these happened to be fatal, but in two cases cars tumbled off the structure, and the occurrence of three such accidents so near together serves as a reminder that the mileage (as well as the train mileage) of elevated railroads in the country is now considerably more than it was at the time when the boast was made that a billion passengers had been carried in elevated cars without fatally injuring any of them.

The disastrous failure of a trestle bridge near Saunders, Wis., on the 8th, was the most picturesque freight train accident of the month, although the members of the crew, except two, escaped alive. Inquiries concerning the cause of this bridge failure elicit no satisfactory response, and it looks as though the presence of a very heavy train on a high trestle designed for moderate loads is the only explanation that is likely to be given. Nearly the whole of this long and heavy freight train sank to the ground (about 100 ft. below the level of the track) in such regular order that most of the cars were found standing right side up, or as nearly so as the surface of the ground would permit, and some of them with the rails of the track in position under them.

The wreck of a work train which fell through a trestle bridge near Wampum, Pa., on the 11th, the circumstances of which were briefly reported in the newspapers the next day, was on a private track used by a contractor. In this wreck two workmen were killed and six injured.

We find accounts of 13 street car accidents in May, in which one person was killed and 49 were injured, two of the latter (in a derailment at Cleveland) being reported as fatally injured. In this derailment a car ran off the track and immediately struck another car on the adjoining track in such a way as to cause its roof to fall in on the crowd of passengers in the car. In New York City a street car was badly damaged by running into long girders extending out from the rear of a truck crossing the track. This accident occurred about eight o'clock in the evening, just at dusk, and the man in charge of the car did not see the girders. At Duluth, on the 17th, where a strike was in progress, a car was badly damaged by dynamite, and in Hoboken, N. J., a car was lifted off the track by a torpedo which had been placed on the rail.

Wall Street.

The July dividend and interest disbursements are only second in importance to those of January, and the distributions on these accounts in the last few weeks have been larger than ever before at this period. Professional Wall Street had hoped that the "reinvestment" of these funds would result in active and higher markets and give an opportunity to dispose of some surplus shares at a profit. So far, however, this has not been realized. There has been only moderate outside buying in the share market. The supply of stocks held by the professionals seems more than enough to meet this demand.

On Monday of this week there was a loss, comparing the low prices of that day with the high quotations of the previous week, in some of the so-called standard stocks, of about four points. Then another rise set in, during which a good part of the losses were recovered. The Boston & Albany and New York Central merger, having been made the basis of a rise, the same sort of talk was brought forward to again help the speculation. Reports are circulated that the relations between the so-called Gould properties in the Southwest are to be made closer, particularly that the Texas & Pacific is to be merged with the Missouri Pacific. This has the perhaps adventitious support that the Texas & Pacific second mortgage income bonds, which have never paid any interest, were exchanged this year for Iron Mountain bonds, bearing a fixed interest of 4 per cent. It has also seemed opportune to revive the rumor that the Chesapeake & Ohio and the Big Four, between which there has long existed a satisfactory traffic agreement and more or less common ownership, would be formally consolidated.

All these reports, and others which make the gossip of Wall Street, are so far unsubstantiated, but they helped to advance prices.

The reports as to the growing crops and the current returns of railroad earnings have, however, given a more substantial basis to the upward movement. The Government crop report, issued this week, would indicate that, unless serious damage comes later on, the yield of corn will be the largest ever harvested, except in 1896 and 1895, while the spring wheat harvest promises to be the largest, with but one exception. This outlook, together with the fact that grain reserves in farmers' hands are generally reckoned large, promises to give the railroads a heavy tonnage for a long time ahead, while the westbound movement still keeps up in good volume. Grain shipments to Chicago last week, in fact, were the heaviest weekly record ever made, and were nearly twice as large as in the corresponding week

a year ago. Railroad earnings have fully reflected this movement, and for June will probably make the first favorable month by comparisons so far this year.

For the fiscal year ending June 30 last, most of the companies so far publishing their gross earnings report very heavy totals. The Chicago, Milwaukee & St. Paul has gained over \$4,000,000, with earnings for the twelve months of over \$38,300,000, or about \$11,000,000 more than in 1895. The Louisville & Nashville gained \$1,707,000 in gross, as compared with last year, and \$926,000 in net. It earned toward dividends over \$2,500,000, and has just declared an extra ½ per cent. in addition to the semi-annual dividend of 1½ per cent. established last January. Other companies so far reporting for the year and showing large increases are the Southern Railway, \$2,630,000; Northern Pacific, \$2,052,000; Denver & Rio Grande, \$936,000; Canadian Pacific, \$1,096,000; Wabash, \$1,192,000, in which the Buffalo extension figures; the Norfolk & Western, \$616,000; the St. Louis Southwestern, \$571,000, and so on.

The pursuit of the robbers who blew up an express car of the Union Pacific with dynamite on the night of June 1 near Wilcox, Wyo., will pass into the police history of the Rocky Mountain region as one of its most exciting episodes, although it appears, at the present writing, to have been a total failure. The officers of the Union Pacific Railroad, with local sheriffs and other experienced scouts, followed the robbers for more than a month, General Manager Dickinson taking an active part in the work for a considerable part of that time. After chasing the robbers about three or four days Sheriff Hazen, of Douglas, Wyo., was killed in a battle with the outlaws. When hard pushed the robbers secured fresh supplies of fuel, ammunition and horses from friendly ranchmen. At one time they escaped capture by swimming a wide and deep stream. They used smokeless powder, and thus were hard to locate even when surrounded. Twice they ambushed their pursuers, and partially repulsed them. On June 12, and again a week later, it was reported that the robbers were cornered, and that their capture was certain, but the sheriffs were disappointed. Several hundred men took part in the chase at various times and a band of 30 experienced scouts continued the pursuit up to June 29. A despatch to the New York Times from Omaha this week says:

F. M. Hans, the well-known Western detective, has returned to Omaha after a long chase after the six men who held up and dynamited the Union Pacific express train in Wyoming June 2. Hans said: "These men have made the most remarkable flight in the criminal history of the West. They have traveled over 1,500 miles since committing the crime, and have been chased by 300 or 400 men constantly, yet they escaped. Time and again they have been surrounded by ten times their number, yet by their desperate nerve and knowledge of woodcraft they have managed each time to get away. They first fled to the 'Hole-in-the-Wall,' I found, but being so hard pressed, and having such a large reward on their heads—\$18,000—they did not dare stop among their old outlaw companions for fear of being betrayed. They kept on into the Big Horn Basin, then turned back and retraced their steps through the Powder River country into the Jackson's Hole country, the wildest and most desolate stretch of mountainous country in the West. Here the Indian police under Baldwin got after them, and chased them south toward the Utah mountains, and it was here that they were completely lost track of. . . . I know George Curry very well. He and his companions will never surrender. They may be killed some day, but they have two horse loads of smokeless ammunition, and in their retreat could stand off an army. I never heard of fugitives making such a fight and flight. None but these very fellows could have done it. . . . I believe this will nearly wind them up, for they have got to put in an appearance at some town in the West some day, and when they do they will be shot down."

The men who operate street railroads might learn various things from the steam railroads, but some of them continue to take very simple lessons in the old and well-known school of personal experience, apparently unmindful of the disreputable name that has attached to such learners since Franklin's time. In the past week the newspapers have reported fatal injury to four passengers in street cars. Near Philadelphia on the night of July 2 a rear collision of electric cars resulted in the death of one passenger and the injury of 13 others. The collision is reported as having been due to the absence of a tail light. The foremost car had been stopped on account of the failure of the electric current, and the car was dark; a following car came around a curve at uncontrollable speed and crashed into the standing car with great force. The president of the road is reported as saying that a tail light was not necessary; that the streets traversed by the company's cars are so well lighted that no motorman would be excusable for not seeing a car in front of him, whether it had a signal light or not. It is said that a passenger on the foremost car, who had seen service as a motorman, prevented a third car from running into the second by quickly getting a headlight from a car on another track and running back, using the lamp as a stop signal. Near Akron, O., on July 7, a butting collision of electric cars caused the death of one man and the fatal injury of two others, and a dozen others were considerably hurt. It is said that this collision was due

to one car running beyond a meeting point, at which, according to the regulations, it should have waited. It is indeed a trifle derogatory to the dignity of an electric car to decorate it with a primitive kerosene lamp; but that appears to be the only satisfactory way of providing the necessary signal for preventing collisions when a car is "dead." Collisions like the second one described above appear to be the result of lax discipline; the regulations say that conductors and motormen must not "steal" switches; but as such stealing often turns out harmless the only way to prevent it is by strict punishment of violations—even when the venturesome conductor pleases his passengers by risking their lives.

The Isthmian Canal Commission's Sub-Committee on the Panama Canal is Prof. W. H. Burr, the head of the Civil Engineering Department of Columbia University; Mr. Geo. S. Morison, Past President Am. Soc. C. E., and one of the most distinguished engineers of America; Col. O. H. Ernst, Corps of Engineers, U. S. A., Brigadier General U. S. V., lately Superintendent U. S. Military Academy; and ex-officio, Rear Admiral Walker, U. S. N., retired. These gentlemen will shortly sail for Paris, there to examine the records in the possession of the New Panama Canal Company. Concerning this the Evening Post of New York says:

With commendable energy the new Nicaragua Canal Commission are setting about their work. It was at once apparent to them that a study of the Panama route—in Paris—was indispensable, and so a committee, headed by Admiral Walker, is to sail immediately for a period of arduous research in that city. It was foolishly objected that copies of all the documents are available in this country; but nothing short of the "originals" will satisfy such resolute inquirers. Paris is believed to be free from yellow fever, whatever the case at Panama, and, anyhow, a little trip there cannot make much of a hole in the \$1,000,000 appropriation. And it is said that the French capital yields many delightful forms of recuperation from severe labor in "the archives."

To those of us who remember the Evening Post from our childhood, and who have read The Nation for 30 years, it is really sad to see how those journals are losing touch with the men who make the opinion and do the work of the world. The insinuation that gentlemen of the professional rank and personal character of the members of the sub-committee would spend their own time and the people's money on an unnecessary journey to Paris is not worthy of the traditions of the Evening Post. The men who made that paper great could never have written that paragraph or permitted it to be printed.

TECHNICAL.

Manufacturing and Business.

We are informed that the Pennsylvania Car Wheel Co. has under way such improvements as will enable the company to increase its production of 300 wheels a day to a maximum production of 650 wheels per day. A portion of this work will be completed within a few weeks and the balance in about one month.

In the last week in June, 1899, the Pressed Steel Car Company delivered 205 100,000-pounds capacity steel hopper cars to the Pittsburgh & Lake Erie and 17 on an order for 1,000 to the Lake Shore & Michigan Southern. In addition, 100 car loads of trucks, bolsters, center plates, etc., were shipped to various railroad companies. The total valuation of shipments for the week exceeded \$368,000. The sales for the month of June, 1899, aggregated \$1,250,000. Exclusive of the steel cars, the total weight of manufactured material delivered—June 24 to 30, inclusive—was 4,397,405 lbs.

The report that the Siemens & Halske Electric Co. of America intends to make automobile motors exclusively in the future is incorrect. The company will continue to make electrical apparatus of all types—arc, alternating and direct current—making a specialty of railroad generators and long distance transmission work.

During the month of June the Climax Stock Guard Co., of Cleveland, O., received orders from 24 different railroads.

The Delaware, Lackawanna & Western has ordered from the S. A. Woods Machine Co., Chicago, Ill., for its Scranton (Pa.) shops, a heavy timber planer and a line of Carse special machines, including mortisers, borers, cut-off saws, etc.

Dudley E. Waters, President of the Board of Public Works, will receive proposals for auxiliary machinery for an electric light station at Grand Rapids, Mich.

The Intercolonial is offering for sale and will receive tenders until July 20 for 15 locomotives, some of which have been running until very lately, some being still in active service and others partly dismantled. They vary in weight, without tender, from 40,000 lbs. to 80,000 lbs., the diameters of driving wheels varying from 48 to 68 in. Most of them have cylinders 16x24, while one has 18x24 and another 14x22. Further particulars can be obtained from the Mechanical Superintendent at Moncton.

The Atlantic Brass Co., of New York, maker of the A. B. C. adjustable car bearing and wedge, has opened an office at 1200 Fisher Building, Chicago,

Mr. A. R. Perry having been appointed Western Agent.

Iron and Steel.

It is understood that the Illinois Steel Co. will soon build two more blast furnaces at South Chicago with a capacity equal to the four blast furnaces recently completed. The new furnaces will be located at Eighty-sixth street, just south of the Cheltenham tract. It is said that the contract has already been let for the work, and that the two furnaces will cost \$800,000.

Government Work.

Bids are asked until July 28 at the U. S. Engineer Office, Washington, D. C., for dredging in Occoquam Creek, Nomini Creek and Lower Machodoc Creek, Va. Further information can be had of Chas. J. Allen, Lieut. Col. of Engineers. Other bids are wanted Aug. 2 for similar work.

Sealed proposals for dredging Newport Harbor, R. I., will be received at the U. S. Engineer office at Newport until July 22. Address D. W. Lockwood, Major of Engineers.

Proposals are wanted until July 21 for dredging and bank protection in waterway from Norfolk, Va., to Sounds of N. C. Thomas L. Casey, Major of Engineers.

Bids are wanted by July 31 for building the Hospital Stewards' quarters, West Point, N. Y., as per plans in the office of the Quartermaster, U. S. M. A., West Point.

Bids are wanted July 22 for building of lock approaches and abutment protection to Lock No. 1, Cumberland River, Nashville, Tenn. M. B. Adams, Lieut. Col. of Engineers.

Bids are asked until Aug. 2, at the U. S. Engineer office, Portland, Me., for dredging the Cocheco River, N. H. Address S. W. Roessler, Major of Engineers.

Bids are wanted July 24 for dredging in Sheboygan and Alpena Harbors, and Saginaw, Sebawaing, Pine and Bell Rivers, Michigan, by Lieut. Col. G. J. Lydecker, Corps Engineers, U. S. A., Detroit, Mich.

Bids are asked until July 22 (change of date) for barracks for the U. S. Naval training station on Coasters Harbor Island, R. I. Address A. S. Crowninshield, Chief of the Bureau of Information, Navy Department, Washington, D. C.

Bids are asked until Aug. 8 for building a wing dam in the Sacramento River near Sacramento. Address Major W. H. Heuer, Corps Engineers, U. S. A., Flood Building, San Francisco, Cal.

Proposals are wanted Aug. 3 at the office of James Knox Taylor, Supervising Architect, Treasury Dept., Washington, D. C., for heating and ventilating apparatus, etc., for the Post Office Building in Buffalo, N. Y.

Bids are wanted July 24 for dredging in Ogdensburg Harbor, N. Y. Graham D. Fitch, Captain of Engineers, Oswego, N. Y.

Bids for dredging in Bay Ridge and Red Hook Channels, N. Y., are wanted July 19 by H. M. Adams, Major of Engineers, U. S. Army Building, N. Y.

Nominating Committee American Society of Civil Engineers.

We gave last week, page 486, a list of the Nominating Committee of the American Society of Civil Engineers. Among the Past Presidents there named appeared Mr. William Metcalf, of Pittsburgh. This is an error, as since the last catalogue of the Society was printed Mr. Metcalf has retired by seniority and Mr. Alphonse Fteley takes a place on the Nominating Committee.

Engines for Electrical Equipment of the Manhattan Elevated.

At a meeting of the Executive Committee of the Manhattan Elevated Railway Co., New York, on Tuesday of this week, the contract was awarded to the E. P. Ellis Co., of Milwaukee, for eight engines of 8,000 nominal h. p. each for driving the electrical machinery in the power house to be built on the East River between Seventy-fourth and Seventy-fifth streets, work on which will be pushed as fast as possible. This power house will be next to the one being built by the Metropolitan Street Railway Co. No contracts for electrical machinery have been let.

Electric Light, Heat and Cold.

The Electric Axle Light & Power Co. has been incorporated in New Jersey with a capital stock of \$25,000,000. It is said that the people chiefly interested in this are those controlling the Electric Storage Battery Co., the Electric Vehicle Co. and the Electric Boat Co. This new company takes over the patent rights, machinery, plant, contracts and good will of the National Electric Car-Lighting Co., Mr. Max E. Schmidt President, which is already doing business in car-lighting by taking power from the axle, and which has a considerable number of cars equipped on the Atchison and a number of experimental equipments out on other roads. The new company proposes not only to light cars by electricity generated from the axle, but also to use current so generated for refrigerating apparatus and also for heating.

THE SCRAP HEAP.

Notes.

The Nashville American says that in consequence of the increased use of air brakes on freight trains the Nashville, Chattanooga & St. Louis Railroad has reduced the number of brakemen on each freight train from two to one.

San Francisco newspapers report that the sale of liquors at bars has been discontinued in all depots of the Southern Pacific. This is in accordance with an order issued a year ago when proprietors of restaurants were notified to prepare for the change.

In Buffalo the Superintendent of City Mail Delivery has been experimenting with an automobile for collecting letters. In a tour covering six miles, letters from 40 boxes were gathered in less than one-half the time that has usually been taken to collect from the same boxes with a horse and wagon.

The Atchison, Topeka & Santa Fe and the St. Louis & San Francisco, in contesting recent orders of the Kansas State Court of Visitation (the reorganized railroad commission), aver that the court has no jurisdiction, and that the law establishing it is unconstitutional.

The land sales of the Northern Pacific Railroad for the fiscal year just ended are larger than ever before. In the Eastern District (Minnesota, North Dakota and Montana) sales were 1,421,000 acres; last year, 946,000 acres; Western District, embracing Washington, Oregon and Idaho, 728,000 acres; last year, 616,679 acres.

The Railroad Commissioners of Arkansas have notified the railroad companies of the State to send in annual reports on or before Sept. 15 for the year ending June 30, 1899. The blanks provided by the Commission correspond with those prescribed by the Interstate Commerce Commission and by most of the other states.

The Corporation Commission of North Carolina has just finished the assessment of the railroad property of the State for taxation for the current year. The total valuation is \$44,114,308, an increase over the preceding year of \$10,494,442. This large increase is chiefly due, not to the construction of new roads, but to the revaluation of old ones.

The State Railroad Commissioners of New York have authorized the Long Island Railroad to discontinue 11 stations in Brooklyn, where the traffic has been nearly all taken away by electric and elevated cars running in the streets. A new station will be established to take the place of three others that are to be discontinued.

The Virginia Board of Public Works has made its valuation of the railroad property of the state for the assessment of taxes for the current year. The length of railroads and canals in the state is 3,691 miles, aggregate valuation \$55,459,454. There is a tax of 30 cents per \$100 on real and personal property; another one on the same property of 10 cents for the support of schools, and a tax of one per cent. on the net income of the corporation. The total tax for the year is \$235,238.

The Wabash has advanced the wages of trainmen as follows: Freight enginemen will receive \$3.90 per 100 miles, in place of \$3.75; freight firemen, \$2.90 instead of \$2.79; freight conductors will receive \$2.90 instead of \$2.80, and brakemen \$1.17 instead of \$1.10; passenger conductors running from 3,000 to 4,000 miles monthly will receive \$90; 4,000 to 5,000 miles, \$100; 5,000 to 6,000 miles, \$105; 6,000 to 6,500 miles, \$110; over 6,500 miles, \$115. Baggage men get 55 and brakemen 30 per cent. of their conductors' pay. Passenger engineers receive \$3.35 per 100 miles' run; firemen, \$1.90 per 100 miles.

The Colorado State Board of Equalization has made up its valuation of railroad property in the state for the assessment of the taxes for the current year. The total is \$31,874,496, an increase of about \$4,000,000 over the preceding year. The Colorado & Southern has its valuation reduced because of the sale of the Julesburg Branch, and the Union Pacific is increased by the acquisition of that branch. The Silverton Railroad has its valuation reduced because it has been unable to do any business since last September. The street railroads of the state are valued for taxation at \$1,256,291, an increase of \$211,590; sleeping cars, \$349,675; telegraph and telephone companies, \$556,422; foreign cars (freight), \$292,000.

The Chicago Drainage Canal.

The Trustees of the Chicago Sanitary District last week made an inspection trip from Chicago to St. Louis down the Illinois River to look into the question of the removal of the dams on that river before the opening of the drainage canal. There are two dams on the Illinois River, one at Henry and one near Copperas Creek, which were built by the State, and lower down the river, at Kamosville and near La Grange, are two more dams, built by the United States Government. In the Sanitary District Act one provision requires that the State dams shall be removed before the drainage canal is opened, while another clause in the law makes their removal depend on the securing of a depth of water which will make it unnecessary for them to remain. There is now a difference of opinion as to the effect of removing these two State dams; one opinion is that the dams will not be a benefit after the discharge of 300,000 cu. ft. of water a minute through the drainage channel begins, but that they will cause

overflows and much damage to land along the river, for which damage the Sanitary District may be liable. Those owning boats on the Illinois River and with shipping interests along the river oppose the removal of the State dams as tending to injure the navigability of the river. The Trustees of the drainage canal have not announced as we go to press which course they will recommend.

At the City Council meeting July 6 Corporation Counsel Walker recommended that a committee be appointed to confer with the Sanitary District Trustees with a view to getting free whatever power the city may need now and in the future. Mayor Harrison appointed a committee of nine Aldermen for the work, who will also formulate any legislation that may be needed.

Bids have been advertised for by the Trustees of the Sanitary District until August 23 for the "Development and Lease of Water Power." Each bid must be accompanied by a deposit of \$50,000 in cash or certified check.

The Texas Flood.

We are still without detailed information concerning the damage wrought by the floods in Texas in the 10 days beginning June 28. The most extensive damage has been in the lower part of the Brazos River Valley, in the counties of Austin, Fort Bend and Brazoria. At Richmond, Fort Bend County, the rise was more than 65 feet. An idea of the extent of the disaster is suggested by the fact that Miss Helen Gould and Mr. C. P. Huntington, of New York, have sent contributions of \$5,000 each to the municipal authorities for the alleviation of suffering. The crest of the flood did not reach Brazoria County until July 10. At that time it was estimated that the total number of persons drowned would prove to be about 100. Officers of the Houston & Texas Central state that between Calvert and Hearne, eight miles, the roadbed of that company will have to be virtually rebuilt. There has been great damage to crops, but estimates of the money losses vary greatly, and some observers say that the benefit to the cotton crop in some districts from the rain will partly offset the loss in the flooded districts. As heretofore reported, the roads which have suffered the most damage are the Gulf, Colorado & Santa Fe, the Missouri, Kansas & Texas, the International & Great Northern, the Houston & Texas Central, the San Antonio & Aransas Pass and the Southern Pacific.

Another New York Tunnel Company.

The Metropolitan Tunnel Railroad Co. of New York and Brooklyn was incorporated on Monday of this week at Albany, with a capital stock of \$50,000, and the privilege of increasing it to a sum sufficient to build the tunnel proposed by the company. The company purposes to connect Brooklyn, Manhattan and Jersey City. The Directors of the new corporation are: Cromwell G. Macy, John A. Foley, James Hynes, William Abbott and George M. McCormick, of Manhattan, and Peter F. Huffman, C. H. Southworth, Theodore A. Madden and C. A. Cregin, of Brooklyn.

Lake Notes.

The Great Lakes Towing Co. was incorporated last week in New Jersey with a capital of \$5,000,000, of which \$2,500,000 is in 7 per cent. preferred and \$2,500,000 in common stock. The charter authorizes the company to do a general towing, wrecking, salvage, dredging and contracting business on the Great Lakes and tributary streams, and to own, operate and deal in by sale or otherwise tugs, ships and vessels of all kinds. The incorporators were: W. F. Coleman Carpenter, Fred W. Klein and Gustave von Den Steinen, all of Jersey City. It is said that the plans of the company include the acquisition of all the tug and towing companies between Buffalo, Chicago and Duluth, but it is reported from Chicago that it is not certain that the large towing companies there will join the organization.

Rail Joins.

Mr. A. Bonzano estimates that there are in the railroad track of the United States about 70 million bridges with an aggregate length of 11,000 miles. Obviously, they are of pretty short span. These bridges, he says, are about one-third as strong as the rails, the ends of which they support, and about one-fifth as strong as the bridges of long span and more ambitious appearance. He estimates that these 70 million weak bridges cause a waste of track labor which amounts to over \$21,000,000 a year, and that on 1,000 miles of railroad there is an annual loss of \$100,000 in hauling trains over these weak bridges, due to the additional resistance caused by their deflection. The means by which he undertakes to overcome these difficulties are fairly well-known to our readers.

Automobiles in Chicago.

In the habeas corpus proceedings at Chicago growing out of the arrest of persons for running automobiles on the boulevards against the rule of the South Park Board, Judge Gibbons decided that the park commissions have no right to prohibit any vehicle used for recreation or pleasure from using the boulevards, so long as the safety of others is not endangered, and ordered the discharge of the person arrested. The court also held that it is not only the right but the duty of the park boards to regulate the speed of such vehicles.

The ordinance requiring operators of automobiles to be examined and licensed was passed by the City Council July 6 under a suspension of the rules by a vote of 53 to 10. The ordinance goes into effect in ten days. The examining board is to be composed of the City Electrician, City Engineer and Commissioner of Health, and the vehicles are to be examined by the same board. The license fee is fixed at \$3 for the first year and \$1 a year for renewals. The examination will only inquire into the general fitness of the applicant to operate an automobile, and will include a physical examination.

The Storage Battery Railroad.

The eight-mile extension of the Chicago Electric Traction Co. (storage battery road), from Blue Island to Harvey, Ill., which was noted in our issue of May 26, p. 376, has been completed and is now in operation. This gives the town of Harvey direct communication with Chicago, and cars are run without change from Sixty-third St. to Harvey (One Hundred and Sixty-second St.), via Blue Island, the fare for the entire distance being five cents.

Chicago's New Coliseum.

Work on the new Coliseum or convention hall, on Wabash Ave., on the site of the Libbey Prison, is progressing rapidly and it is expected that it will be ready for use Oct. 1. The main building will be 302

ft. long and 172 ft. wide, with an Annex the same width and 50 ft. long at the south end. The roof will be arched and 85 ft. high. The materials used will be steel, stone and brick on a pile and concrete foundation and there will be eleven exits. The building covers 1½ acres and is being built under the direction of Mr. E. C. Shankland. The inside will have a large audience hall with a gallery 30 ft. deep around the sides, and a total seating capacity of 15,000 people. Under the stage at one end will be space for permanent telegraph stations and room for reporters, from which it is proposed to run a line of pneumatic tubes to the downtown office of the Associated Press.

A Fast Run on the "Q".

On June 28 the eastbound fast mail train, No. 8, on the Chicago, Burlington & Quincy left Mendota, Ill., 40 minutes late, and ran to Riverside, 72 miles, in 62 minutes, or at the rate of 69.67 miles an hour. The train was hauled by one of the Burlington's class "P" Baldwin locomotives, No. 1,591.

Bridge Inspection in Massachusetts.

The Massachusetts Railroad Commissioners have issued notices under the new law for inspection of street railroad bridges in Massachusetts, requiring the various street railroad companies before Nov. 1 to make returns of each bridge of over ten feet opening in the clear, between abutments, giving number of the bridge, its precise location, nature of crossing, whether stream, street, etc.; number of openings and clear span of each, length over all, material, approximate maximum height of rail above stream, streets, etc.; date of erection, names of designer and builder, weights of the heaviest cars of the several types on each line, giving load on each axle, and distances between axles. In addition, the Board asks for complete detail plans for every bridge, a copy of the specifications or agreements under which each bridge was built, and a report of inspection by a competent and experienced engineer.

Port Works at Montevideo.

Minister Finch writes from Montevideo, May 12, 1899, in regard to the proposed harbor improvements at that place. The Minister of Public Works has matured a scheme for providing the necessary funds to pay the cost of construction and has approved plans and specifications, on which intending bidders shall base proposals. The expenditure will be not less than \$15,000,000, and possibly as much as \$20,000,000. The Vice-Consul at Montevideo, Mr. Howard, urges that a representative of some United States firm be sent at once, equipped with documents bearing official indorsement, to satisfy President Cuestas and his Ministers of the financial ability and the skill and capacity of the parties whom he represents, to carry out the work in accordance with the plans and specifications. French and English representatives have already given notice that the money is available.

'Frisco Employees' Hospital.

An Employees' Hospital Association has been organized on the St. Louis & San Francisco and a general hospital is being built at Springfield, Mo. This hospital will be ready for use in about a month. The Association makes arrangements with local hospitals at St. Louis, Fort Smith, Paris, Joplin, Pittsburg and Wichita, for treatment of emergency cases, and dispensaries will be established at convenient points throughout the company's lines. Employees who receive less than \$50 will contribute to the support of the Association 35 cents a month; those receiving from \$50 to \$100, 50 cents; \$100 to \$125, 75 cents; above \$125, \$1. The railroad company will pay \$500 a year toward the support of the hospital.

Failure of the Detroit Municipal Ownership Law.

The Supreme Court of Michigan, in an unanimous opinion, has declared unconstitutional the law recently passed in that State empowering the city of Detroit to buy, own and operate street railroads. The law is declared to be in contravention of the constitutional provision prohibiting the State to engage in works of internal improvements. By authorizing various municipalities to operate roads and make transfer arrangements with roads partly without the municipal limits, the State might be covered with railroads owned and operated by municipalities, and the State thus be enabled to do through agencies created by itself what the Constitution forbids it from doing directly. The clause in question reads: "The State shall not be a party to or interested in any work of internal improvement, nor engaged in carrying on any such work except in the expenditure of grants to the State of lands or other property." The ruling might seem to also declare invalid public ownership of lighting and water-works, but the Supreme Court specifically says: "Municipal ownership of electric lighting and water-works plans is justified as an exercise of police power, but municipal ownership of railroads cannot be authorized on any such grounds."

Plain Talk in Louisville.

The Louisville & Nashville Railroad having been accused by a newspaper of pernicious activity in political affairs, its president, Mr. Milton H. Smith, has replied, denying that the road had taken part in the campaign as a corporation, but admitting that some of its officers and employees had done so in order to protect the road's interests. He goes on, with refreshing frankness, as follows:

"Senator Goebel has for many years been a successful speculator in damage claims for personal injuries. In the pursuit of this business he is said to have amassed a fortune. For about 15 years he has been a legislator and during that period has exerted himself with more or less success to secure the enactment of legislation unjustly affecting the interests of corporations and in some instances attempted to promote his personal interests. . . . The Louisville & Nashville road will immediately, and of its accord, quit politics as soon as all parties unite in determining that the material interests of the State shall be justly protected and promoted. Until this is done, it will, while abusing no privilege granted it, use all of its legal remedies to assert and maintain its rights."

Electric Railroad Notes.

By the sale of the property of the Kings County and the Fulton Ave. Elevated railroads during the week to August Belmont, representing the Reorganization Committee, the Brooklyn Rapid Transit Co. gains control. The bid for the Kings County was \$2,000,000, and that for the Fulton Ave. line was \$1,500,000. On July 7 the Kings County Elevated Railroad Company, a reorganization of the Kings County and Fulton Elevated Railway Company of Brooklyn, was

incorporated with a capital of \$8,800,000, of which \$2,800,000 is preferred stock entitled to a non-cumulative dividend of not more than 5 per cent. per annum, and \$6,000,000 common stock. The Directors of the new company are E. Mora Davison, Welton C. Percy, Charles H. Warner, George S. Bonner, Walter F. Wood, Adolph Frank and William J. Cahill of Manhattan, and John L. Wells and Benedict Hamburger, of Brooklyn.

Until recently engineers of English tramways found it necessary to rely on American and sometimes on continental working costs of street railroads in order to show the economy of electricity over other power. Recently the published figures for the Leeds lines to the end of March, 25, 1899, show the working expenses to be as follows: Electric, 8.82 cents; steam, 18.6, and horse, 18.88. The receipts per car mile were: Electric, 24.66 cents; steam, 23.6, and horse, 19.6. The working expenses are thus shown to be lower and the receipts higher on the electric than on the other lines.

It is expected that by September the power house of the Dublin Tramway will be completed and that the new electric lines will be put in service this Fall. Much of the machinery and apparatus for the power house has been furnished by American makers. The steel work has been done by Messrs. Riter-Conley Mfg. Co., of Pittsburgh, Pa., and the coal handling machinery has been supplied by the C. W. Hunt Co., of New York. The engines are being built on the main floor by the E. P. Allis Co., of Milwaukee. The engine and boiler houses measure 83 ft. from the lowest floor to the apex, and the main building is 80 ft. wide inside and has a steel roof, with a single span of 200 ft. Two Green fuel economizers have been installed.

The Atlanta Railway & Power Co. will build a power and lighting plant that will cost \$750,000, to furnish all the power for the consolidated trolley lines recently incorporated under the name of the Atlanta Railway & Power Co. Power will also be supplied for commercial purposes.

The Huntsville (Ala.) St. Ry. is officered as follows: T. C. DuPont of Johnstown, Pa., President; John H. Waters of the same city, Treasurer, and N. F. Thompson, Secretary. Work on the nine miles of road is now progressing. The original franchise said girder rails, but these could not be had at once, so the City Council has allowed T rails to be used.

The Perth Amboy Electric Ry. has completed all the engineering details for building the proposed road, and is ready to receive bids for construction. Leonard Lewisohn is President and J. C. McCoy of the Raritan Copper Works is Secretary and Treasurer.

The Third Ave. Ry. Co. has filed plans with the Building Commissioners for the new power house which is to cost about \$1,000,000.

The Port Chester Electrical Railroad Co., notwithstanding the proceedings against it in the courts, has stolen a march on the townspeople of Rye, N. Y., by building the road on Sunday and practically completing a trolley road to Rye Beach.

Technical Schools.

University of Illinois.—G. A. Goodenough has been appointed Assistant Professor of Mechanical Engineering to succeed Prof. W. H. Van Dervoort, whose resignation we noted some time ago. Prof. Goodenough graduated from the Michigan Agricultural College in 1896, and received his post-graduate degree from the University of Michigan at Ann Arbor. He was an assistant in the Mechanical Engineering Department of the University of Illinois for two years, from 1894 to 1896, and went from there to the Scranton Correspondence School, where he has remained until now.

Plans are being prepared by Mr. Joseph C. Llewellyn, Architect, Chicago, for the new building for the Agricultural Department which is to be built from the \$150,000 appropriation for that department made by the Illinois Legislature last winter. The building will be located on the University campus on Burrill Ave., south of the main building. It will be built of brick, three stories high and will have two annexes back of and connected to it by long corridors. Bids will be asked about July 25 and contracts let for the work early in August. The building will be heated and lighted from the central heating and lighting plant of the University, in which about 300 h. p. of additional boiler power will be installed. The steam and electric current will be carried from the chemical building to the new agricultural building through a tunnel several hundred feet long.

LOCOMOTIVE BUILDING.

The Baldwin Locomotive Works are building two locomotives for the Choctaw & Memphis.

The Kansas City, Fort Scott & Memphis has ordered from the Pittsburgh Locomotive & Car Works three eight-wheel engines.

The Terre Haute & Indianapolis (Vandalia Line) is having one engine built by the Pittsburgh Locomotive & Car Works.

The Atlantic Coast Line has ordered one engine from the Richmond Locomotive & Machine Works and two from the Baldwin Locomotive Works.

The locomotives for the Indiana, Illinois & Iowa, referred to in our issue of June 16, have not yet been ordered, but it is reported that they will be placed with the Pittsburgh Locomotive & Car Works.

The Erie has just ordered from the Brooks Locomotive Works 20 consolidation freight locomotives. They will have 21 in. x 28 in. cylinders, and will be duplicates of those built by the Brooks Locomotive Works for the same road in May and June, except that the engines now ordered will have Wootten boilers.

The Washington County has ordered one eight-wheel passenger engine from the Brooks Locomotive Works. The specifications call for the following: Total weight, 107,000 lbs.; weight on drivers, 70,800 lbs.; cylinders, 18 in. x 24 in.; driving wheels, 62 in. in diam.; boiler, wagon top type, 150 lbs. steam pressure; tubes, 225, lap welded charcoal iron, 2 in. in diam. and 11 ft. 7 in. long; fire box, steel, 97 in. long and 33 in. wide; tank capacity for water, 4,000 gals.; New York air brakes, hammered iron axles, Monarch brake beams, Standard couplers, Monitor injectors, Jerome piston and valve rod packings, Coale safety

valves, French springs and Consolidated Car Heating Co.'s steam heat equipment.

The four six-wheel switching engines ordered by the Great Northern from the Brooks Locomotive Works, and referred to in our issue of June 16, will weigh 108,000 lbs. and have 18 in. x 26 in. cylinders, 49 in. driving wheels, improved Belpaire boilers, with a working steam pressure of 180 lbs., and 225 lap welded charcoal iron tubes 2 in. in diameter and 11 ft. 1 1/2 in. long; fire boxes, steel, 97 in. long and 33 in. wide, and a tank capacity for 4,000 gals. of water. The engines will be equipped with B. L. W. improved piston valves, New York air brakes, Sterlingworth brake beams, Jerome piston rod packing, B. L. W. special valve rod packing, Crosby safety valves, Leach sanding devices and French springs.

The four simple 10-wheel passenger locomotives which the Chicago, Burlington & Quincy is building at its Havelock shops, as noted in our issue of July 9, will weigh 146,200 lbs., of which 110,800 lbs. will be on the driving wheels. The specifications call for 19 in. x 26 in. cylinders, 72 in. driving wheels, Belpaire boilers with a working steam pressure of 200 lbs.; 291 charcoal iron tubes, 2 in. in diameter and 15 ft. 1 in. long; steel fire boxes, 9 ft. long and 3 ft. 4 in. wide, and a tender capacity for 5,000 gals. of water and 8 1/2 tons of coal. The road will also build at its own shops four freight engines with six driving wheels, 64 in. in diameter, and one pair of leading and one pair of trailing truck wheels. The engines will weigh about 138,000 lbs., and have boilers with wide fire boxes.

It has been stated that the Chicago & Alton has ordered 22 engines from the Brooks Locomotive Works. This refers to locomotives ordered in January last by the St. Louis, Peoria & Northern, since acquired by the Chicago & Alton. The order calls for 10 heavy consolidation freight and 12 eight-wheel express passenger engines, both types to be fitted with B. L. W. improved piston valves. The freight engines will weigh 159,000 lbs., of which 170,000 lbs. will be on the driving wheels and have 21 in. x 32 in. cylinders, 57 in. driving wheels, improved Belpaire boilers, with a working steam pressure of 200 lbs. and 374 lap welded charcoal iron tubes 2 in. in diameter and 13 ft. 6 1/2 in. long; steel fire boxes, 121 in. long and 42 in. wide, and a tank capacity for 6,000 gals. of water; the passenger engines will weigh 134,000 lbs., with 87,500 lbs. on the driving wheels, and have 19 in. x 26 in. cylinders, 73 in. driving wheels, wagon top type of boilers, with a working steam pressure of 210 lbs.; 306 lap welded charcoal iron tubes 2 in. in diameter and 12 ft. 7 1/2 in. long; fire boxes, 114 in. long and 42 in. wide, of steel, and a tank capacity for 6,000 gals. of water. All the engines will be equipped with New York air brakes, hammered iron axles, National hollow brake beams, Janney couplers, Hancock locomotive inspirators, Jerome piston rod packing, B. L. W. special valve rod packing, Leach sanding devices, French springs, Midvale driving and engine truck wheel tires and cast iron plate tender wheels.

CAR BUILDING.

The Bay Terminal has ordered 100 cars from the Haskell & Barker Car Co.

The Pittsburg & Lake Erie denies that it is figuring on buying new box cars.

It is stated that the Bangor & Aroostook has ordered 150 cars from the American Car & Foundry Co.

The Baltimore & Ohio has ordered 150 cars from the American Car & Foundry Co., to be built at Chicago.

The Cumberland & Pennsylvania has placed an order with the South Baltimore Car Works for 20 freight cars.

The Chicago, Rock Island & Pacific expects to soon order some passenger cars, but the details have not yet been settled.

We are informed, but not officially, that the Wisconsin Central has ordered 12 passenger cars from the Barney & Smith Car Co.

The Delaware & Hudson Canal Co. has increased the order placed in December last with the Union Car Works to 475 cars in all.

The Venice Transportation Co., of St. Louis, Mo., has placed an order with the Litchfield Car & Machine Works for 20 freight cars.

It is reported that Swift & Co. contemplate increasing their order for refrigerator cars, which was let to Wells & French some time ago.

It is reported that the American Car & Foundry Co. has an order for 35 logging cars for the Alamo-gordo Lumber Co., to be built at the St. Louis works.

John Morrell & Co., Ltd., Ottumwa, Ia., has ordered 30 cars from the American Car & Foundry Co. for the Morrell Refrigerator Line; they will be built at Chicago.

The St. Louis Southwestern has bought 500 second-hand box cars from the Wisconsin & Michigan Car Ferry Co., and will not order the new cars for which it has been in the market.

The Illinois Central has ordered 500 80,000-lb. box cars, 40 ft. long, from the American Car & Foundry Co. These cars will probably be built at the St. Louis works of the car company, and are for August and September delivery. It is reported that the Illinois Central is considering building some coal cars at its own shops.

BRIDGE BUILDING.

ALTOONA, PA.—Citizens of this place and the borough of Juniata will ask the Pennsylvania RR. to bridge the railroad tracks at the Juniata station.

ARCHBAID, PA.—Reports state that the Delaware & Hudson will remove the old truss bridge on North Main St., provided that the Council allow the company to build a new bridge at that point.

ATLANTA, GA.—The Southern Ry., according to report, has asked the city to assist in building the proposed new bridge over the railroad tracks at Whitehall St. The Atlanta Ry. & Power Co. will use the bridge and pay part of the expense. (April 28, p. 303.)

AUSTIN, TEX.—Despatches to Austin from the Brazos River valley indicate that the flood has destroyed over 400 county bridges and about 250 railroad bridges.

BELLEFONT, PA.—Reports state that the Central RR. of Pennsylvania will ask the Council to change North Thomas St. so as to remove the grade crossing. The work will probably necessitate a bridge.

BERGHOLZ, O.—The Commissioners of Jefferson County, according to report, will build a bridge over Yellow Creek at Russell's Crossing in Brush Creek Township.

BOND HILL, O.—Mayor E. F. Wiess and a delegation of city officers have petitioned the County Commissioners for a bridge over Ross Run at Pad-dock Road, in Bond Hill. The County Engineer reported that it would cost \$10,235.

BOSTON, MASS.—The Harbor and Land Commissioners of Massachusetts have approved the general plans for a new bridge to replace the Malden bridge over the Mystic River between Charlestown and Everett. The bridge is to be built by the city of Boston, and will be on piles, 60 ft. wide, with draw openings of 50 ft. Detailed plans will be approved later.

The city of Boston has made plans for the reconstruction of Bennington St. in East Boston to a width of 100 ft., with grade crossings of the tracks of the Boston & Albany and the Boston & Maine railroad and an overhead bridge crossing the Boston, Revere Beach & Lynn tracks. To these plans the railroads object and a hearing was set for July 12 by the Railroad Commissioners.

BOWLING GREEN, O.—At a joint meeting of the Commissioners of Wood and Lucas Counties, held here, the plans and specifications of the Osborn Engineering Co. of Cleveland were adopted. The bids for the construction of the new bridge across the Maumee River at Grand Rapids will be received until noon of July 28. There are six spans of 108 ft. each, with 18 ft. roadway. William M. Godfrey, County Auditor.

BUENOS AYRES, ARGENTINE.—Charles Lewall, General Manager of the Argentine North Eastern Ry. Co., in a report says that the temporary timber bridges across the three large rivers, the Corrientes, Batel and the Lucia, on the line of the road, will be replaced by permanent structures. The spans of the bridges are respectively 2,055.346 meters, 340.16 meters and 498.44 meters long.

BURLINGTON, VT.—We are informed that the city of Burlington expects to build an iron bridge this season of two spans of about 150 ft. long each, for which specifications will be submitted before contract is awarded. N. K. Brown, Chairman of the Board of Street Commissioners, may be addressed.

CAMDEN, N. J.—The bridge over Timber Creek at Broadway has been declared unsafe by the Bridge Committee of the Board of Freeholders of Camden County.

The steel highway bridge which will be built over Penshankin Creek will be 40 ft. long, and not as incorrectly stated last week.

CARROLLTON, KY.—A meeting was held July 5 to consider the request of the Carrollton Electric Ry. & Bridge Co. to build a bridge across the Kentucky River at this place. (Jan. 27, p. 70.)

CARROLLTON, MO.—We are informed that bids were let July 3 as follows: For a 40 ft. span in Section 90, Carrollton Township, to P. D. Swank; for a 20 ft. span in Section 25, Hill Township, to J. W. Scott, and for 30 ft. and 36 ft. span structures in Washington and Fairfield Townships, to Frank Yehle. (June 23, p. 459.)

CASCADE, IA.—The Board of Supervisors, according to report, has decided to build eight bridges.

CHESTER, PA.—The Street Committee, according to report, has a request from the Philadelphia & Reading Ry. to consider a bridge over Melrose Ave.

CHICAGO, ILL.—An ordinance is being prepared to allow the Chicago & Northwestern and the Chicago, Burlington & Quincy to erect the proposed viaduct at Canal street over the tracks of those roads. The ordinance is in accordance with the agreement made by the companies to build such a viaduct, advancing \$46,500 for that purpose. It provides, however, that the city is to promise to pay \$19,000. This extra amount is necessary to make the viaduct suitable for street car traffic.

The plan for elevating the tracks of the Pennsylvania and the Western Indiana railroads from 18th St. south provides for many subways. The one at 53d St., which would be 1,700 ft. long, could not be built for less than \$500,000 it is estimated. There is another subway at 51st St. the same length, which the companies are willing to build. An ordinance provides for the tearing down of the 35th St. viaduct and the substitution of a subway there.

DARBY, PA.—A new bridge over Cobb's Creek will probably be built; also the one over Darby Creek enlarged.

DAVENPORT, IA.—The Bridge Committee, according to report, contemplates building three bridges.

DAYTON, O.—Proposals will be received at the office of City Comptroller Robt. H. Ferguson until 12 o'clock, noon, July 18, for furnishing material and construction of a steel girder bridge across the Miami and Erie Canal at Wayne Ave. Bids for paving and iron work must be separate. This is the bridge for which bids were rejected May 31 as being too high. The bridge is a 40-ft. span, with two roadways and two sidewalks, each 13 ft. wide. (June 2, p. 392; June 16, p. 436.)

DECATUR, ILL.—Albert H. Cope, Town Clerk, informs us that the Highway Commissioners of Decatur Township, and a committee of the Board of Supervisors of Macon County, will receive bids at his office at 10 a. m., July 18, for repairs as follows to the Wyckoff bridge over the Sangamon River: 1. Replacing the 125 ft. arch span with a new steel span; 2. Adding new steel joists to the old spans (31,056 lbs.); 3. Laying new floor over the entire bridge (425 ft.); 4. Adding channel fence to the two 60 ft. spans; 5. Repairing the fence on the four 45 ft. girder spans; 6. Painting the entire bridge; 7. Adding to the length of the two brick abutments; 8. Removing all old material.

DES MOINES, IA.—The Council has passed an ordinance requiring bids to be asked for the steel Melan arch bridge across the Des Moines River at Sixth Ave. (May 26, p. 377.)

DOWNIEVILLE, CAL.—Henry E. Quigley, Clerk to the Board of Supervisors, informs us that no contract has yet been let for the bridge across the North Fork of Oregon Creek at Forest City. Bids received June 20 were too high. He asks what the cost will be for a steel span 50 ft. long, capable of carrying 15,000 lbs., on 18 ft. piers filled with cement.

ELKTON, MD.—The Cecil County Commissioners have decided to build new iron bridges over Bullfrog Run, near Elkton, one at Basin Run, near Liberty Grove, and one at Principio Furnace over Principio Creek. Bids are wanted Aug. 1.

FOOSLAND, ILL.—The Wabash, according to report, will build a new single span bridge of iron on stone abutments at the crossing of the Sangamon, north of this place.

FORSYTH, MO.—We are informed that a bridge, probably steel, is in contemplation across the White River at this place, and also that a wooden bridge will probably be built across Awan Creek between Forsyth and Chadwick on Mart Road. W. R. Adams, County Surveyor, Roodloe, Mo.

HAILEY, IDAHO.—Bids will be received by the Commissioners of Blaine County on July 28 for the construction of a bridge across Wood River, near the site of Bullion bridge, upon following specifications: One span 100 ft., 16 ft. roadway. Separate bids will be received for combination or steel bridge of a capacity of 40 tons. W. E. Heard, Clerk, Board of County Commissioners.

HAMILTON, ALA.—The Alabama Jail & Bridge Co., Jasper, is building a 100 ft. span steel bridge across Bull Mountain Creek, 12 miles from Hamilton. They are also building a steel bridge of 150 ft. span across the Luxapallia River near Winfield; also one of 100 ft. at Mooresville, Limestone County.

HARTFORD, CONN.—Regarding the rumors of new bridge building in Hartford, City Engineer Chas. H. Bunce informs us that the city of Hartford is not contemplating building any new bridges at the present time.

HASTINGS, MINN.—The high bridge over the Mississippi River at this place was destroyed by the recent tornado.

HELENA, MONT.—We are informed that nothing definite will be done regarding the proposed new bridge over the Missouri River near this place until the Board of County Commissioners have met. The only bridge now under construction by Lewis & Clarke County is that over the south fork of the Dearborn River, about 50 miles north of Helena, by the Missouri River Bridge Co. of Leavenworth, Kan. It is a 75 ft. through truss. (Jan. 13, p. 31.)

HUNTINGDON, PA.—Press reports state that three bridges were washed away last week.

IRONDALE, O.—The Commissioners of Jefferson County, according to report, contemplate building an iron bridge at this place.

JACKSON, KY.—Proposals are wanted by Judge J. Wise Hagins for an iron span bridge 100 ft. long on steel piers 5 ft. in diameter and 42 ft. high, across Quicksand Creek, three miles east of Jackson, by July 17.

JERSEY CITY, N. J.—The following bids were received for the construction of the new bridge over the Pennsylvania Railroad cut at Baldwin Ave.: Dean & Westerbrook Bridge Company, \$31,900; T. R. Long & Co., \$29,550; P. E. Buddington, New Haven, \$32,000; Berlin Iron Bridge Company, \$32,000; Palisade Construction Company, \$31,500; Fagan Iron Works, \$31,000; M. T. Connolly Construction Company, \$30,500; Toledo Bridge Company, \$32,950; Youngstown Bridge Company, \$30,150; Wrought Iron Bridge Company, \$32,300. (June 30, p. 480.)

JOLIET, ILL.—Contracts are yet to be let for a small bridge over the Drainage Canal near Joliet. It is to have three 200-ft. spans. The roadway of the bridge will be 13 1/2 ft. wide and the sidewalk 6 ft. wide. The work will be let by the Sanitary District, Isham Randolph, Chief Engineer.

JONESBORO, TENN.—The Southern Bridge Co. of Birmingham, Ala., has been awarded the contract for the county bridge across the Watanga River at De Vault's Ford. (April 14, p. 269.)

KNOXVILLE, TENN.—The County Court has appropriated a total of \$1,725 for bridges. The second district obtained \$500 for Bell Ave. bridge. Many small structures are contemplated.

LEBANON, PA.—An overhead bridge crossing the Philadelphia & Reading RR. tracks will probably be built between Fourth and Fifth Sts. Wm. P. Kimmel is a member of the Highway Committee.

LEWISTON, IDA.—The steel cantilever bridge 1,700 ft. long, which a Pittsburgh company has been building over the Snake River between Lewiston and Concord for the Lewiston Water & Power Co., is finished, and was to be used July 4th for the first time. The entire work cost \$110,000. (Oct. 7, 1898, p. 730.)

LOS ANGELES, CAL.—Bids are wanted July 17 for building a 300 ft. steel bridge over the Los Angeles River at Ninth St.; also for a steel bridge 225 ft. long over the Arroyo Seco at Ave. 26, and also for a steel bridge 130 ft. long over the Los Angeles at Los Felis road. Frank H. Olmstead, City Engineer. (June 9, p. 415.)

MASCOUCHE, QUE.—Tenders are being received for building an iron bridge and two stone abutments over the River St. Jean-Baptiste. Particulars from J. P. Lamarche, Secretary and Treasurer.

MIDDLEBORO, MASS.—The Town Council has voted to build a new bridge over the Taunton River between Middleboro and Bridgewater, and to appropriate \$6,000 for it.

MILES CITY, MONT.—The County Commissioners have awarded the contract for constructing the Powder River and Mizpah Creek bridges. Thirteen bids were submitted. W. S. Hewett of Minneapolis was the successful bidder. The others were: Gillette-Herzog Co., Minneapolis; Missouri Valley Bridge & Iron Co.; Kings Bridge Co., Cleveland, Ohio; A. M. Blodgett, Kansas City; L. H. Johnson, Minneapolis.

Dibley & Robinson, Minneapolis Bridge Co.; O. F. Pappard, Missoula; N. Stark Bridge Co., Des Moines; California Bridge Co., San Francisco; W. S. Hewett, Minneapolis. (June 16, p. 437.)

NATCHITOCHES, LA.—The Natchitoches & Grandcore Railway & Bridge Co. has been organized to build a railroad and traffic bridge across Red River. Estimates are wanted. Address Simcoe Walmsley, Secretary.

NEW BEDFORD, MASS.—The question of separating the grade of the new Fairhaven bridge and the N. Y., N. H. & H. RR. at the New Bedford end will come before a joint tribunal, the Railroad and the Harbor and Land Commissioners of Massachusetts, at the rooms of the Railroad Board, on October 2. The Joint Commission will report its findings to the Legislature of 1900. (May 12, p. 342.)

NEW YORK, N. Y.—Plans for the two new bridges over the East River are in contemplation, but it is not decided where the bridges should cross the river. One will connect Manhattan with Queens, over some part of Blackwell's Island. The other bridge will be somewhere between the New York & Brooklyn Bridge and the new East River bridge, and the Manhattan approach probably will come near Chatham Square.

Bridge Commissioner John L. Shea, in his annual report, states that all the bridges in the Borough of Queens are too light for present use.—Plans have been made for a new high-level swing bridge, with opening of about 100 ft. each, at the Vernon Ave. crossing and Newton Creek, and for the crossing of the Long Island RR. tracks above grade.—A plan has been made for a new iron bridge and two masonry abutments for the proposed Greenpoint Ave. bridge.—The Commissioner states that the location of the Grand Ave. bridge, being on a curve, is an improper one and should be changed to Maspeth Ave. It has not yet been decided whether the present structure is to be removed and a new one built.—The proposed new bridge over the Mott Haven Canal is still waiting for the removal of the inflection. Meanwhile the old bridge has been strengthened. The canal at this point will probably be filled up and no bridge built.—A new bridge is recommended on Madison Ave. at 135th St., over the Harlem River. The present one is too narrow for the traffic.—The two wooden bridges across Spuyten Duyvil Creek called Kings bridge and Farmers bridge, are old and inadequate and should be replaced by new structures.—The bridge over Newton Creek at Metropolitan Ave. will require extensive repairs during the course of the next year.

A resolution will probably shortly be introduced in the Council providing for an issue of \$644,000 of bonds for the construction of a bridge to take the place of the one over Newton Creek between Manhattan and Vernon avenues. The present bridge has been condemned by the Government.

See also "Other Structures."

NORVAL, ONT.—A steel bridge costing about \$1,300 will be erected here, according to report.

PEMBROKE, ONT.—The Road and Bridges Committee has reported to the County Council that the Taylor bridge should be rebuilt.

PITTSBURGH, PA.—The County Commissioners have approved the application of Capt. W. B. Rodgers and others for a bridge to span the ravine at West Bellevue, connecting the boroughs of Bellevue and Avalon, according to report.

PLYMOUTH, MICH.—Reports are that the Detroit, Plymouth & Northville Railroad will build eight bridges between Northville and Plymouth. The first one, which crosses Argo Lake, will be 390 ft. long.

RUSK, WIS.—We are informed that bids will be wanted by Owen Patnandy, Town Clerk, some time in November, for a 40-ft. two-span central pier bridge across the Sandy Creek in this town.

ST. JOHNSBURY, VT.—Reports state that the Town Council has under consideration four plans for a new iron bridge across the St. J. & C. L. RR. tracks, estimated to cost \$30,250, exclusive of the abutments. O. W. Orcott or George Ranney may be addressed.

SAUK RAPIDS, MINN.—The Lafayette Bridge Co., according to report, has the contract for the wagon bridge of three spans across the Mississippi River at this place.

SHARPSBURG, PA.—Reports state that the Consolidated Traction Co. has agreed with the West Penn RR. Co. regarding the proposed new bridge over the river and the railroad tracks at Sharpsburg. (Nov. 25, 1898, p. 850.)

SHELBYVILLE, IND.—Proposals will be received at the Auditor's office of Shelby County until July 15 for two iron bridges and the substructure of same. One bridge to be across Little Sugar Creek, near Fairview Church, in Van Buren Township, and to be 36 ft. long, the other bridge to be in Addison Township, across Lewis Creek, on the Michigan Road. E. T. Carson, Auditor, Shelby County.

SHERMAN, MICH.—The Manistee River bridge, west of Sherman, has been declared unsafe by the Commissioners of Wexford and Springville townships. It will be taken down and a new one built.

SHREVEPORT, LA.—Of the \$300,000 which the Kansas City, Pittsburg & Gulf receivers have borrowed, at least \$250,000 will be spent in building a new bridge over the Red River at Shreveport. The present bridge has been condemned.

SPRINGFIELD, ILL.—The Board of Commissioners of Sangamon County has let contracts for five new bridges across various streams in the county. The Indianapolis Bridge Co. secured the contract for an iron bridge across Sangamon River in Clear Lake Township. It will cost \$2,472, and will be a 100-ft. span, with 16-ft. approaches at each end. The Springfield Bridge & Iron Co., of this city, will construct three bridges in Maxwell Township, across a branch of the Sangamon River, to cost \$1,235. The bridges will each consist of 30-ft. spans with approaches, uncovered, and will be of iron and wood. The Indiana Bridge Co., of Muncie, Ind., secured the contract for a bridge of iron and stone over Spring Creek, near Riverton, for \$975. J. L. Fortado & Son, of Springfield, will do the stone work.

STOCKTON, CAL.—The bridge over the Calaveras River on the Lower Sacramento road, has broken down. It will probably be replaced by a modern steel structure.

Engineer Quail has completed plans for the McGee steel bridge to span the Mokelumne, one mile north of Clements. The estimated cost is \$5,000.

THORNDALE, ONT.—Wm. Lee, Clerk West Missouri Township, is receiving bids for building two combination bridges.

TROY, ALA.—See "Other Structures."

WATERBURY, CONN.—The bridge which the electric railroad will build over the Naugatuck River for an extension to Oakville, will be built of sufficient width for a single track and cross the river obliquely. (May 12, p. 342.)

WINNIPEG, MANITOBA.—It is said that the Canadian Pacific will build a subway on Main St., an overhead bridge being impracticable.

WINSTON, N. C.—The Chamber of Commerce has appointed a committee to solicit additional funds for the two bridges proposed across the Dan River. Forsyth is to pay \$2,000 and Stokes \$6,000 for this work.

WOODSTOCK, VA.—Reports state that a movement is on foot to build a foot-bridge over the Shenandoah River near Red Banks.

Other Structures.

AUSTIN, TEX.—Bids are wanted by July 22 by T. B. Cochran, Chairman of the Board of Managers of the State Lunatic Asylum, for an associate dining hall, to cost not more than \$37,100, and for a hospital building to cost \$10,000.

Bonds to the extent of \$50,000 will soon be issued for a high school building.

ALEXANDRIA, EGYPT.—Bids are asked until Nov. 28 for building quays, etc., at Alexandria, Egypt. Reports state that the coal mole will be widened and five lines of railroad laid, and machinery erected capable of unloading from 800 to 1,000 tons of coal in ten hours.

BALTIMORE, MD.—We are informed that the Pennsylvania RR. Co. intends to build a warehouse at the foot of Bond St. in Baltimore, and that the building will be 100x300 ft. in size and four stories in height.

BLACKWELL, OKLA.—Colonel A. J. Blackwell, of this place, reports state, is considering plans for a new opera house with an iron framework.

BOISE, IDA.—Proposals are wanted Aug. 7 for building the U. S. Public Building. Address James K. Taylor, Supervising Architect, Treasury Dept., Washington, D. C.

BROOKLYN, N. Y.—The contract for the iron work on the new office building corner of Court and Joralemon St. has been awarded to J. B. & J. M. Cornell.

Work on rebuilding the machine shop in the New York Navy Yard, which was burnt last February, will probably soon be begun. The general drawings for the shop were completed in the Steam Engineering Bureau in Washington in April.

The Long Island RR. will build a new station midway between Linwood St. and East New York.

BRUSSELS, ONT.—The Grand Trunk Depot at this place was destroyed by fire July 1.

CAMDEN, N. J.—President Henry G. Morse, of the New York Shipbuilding Co., in an official announcement, says that the company has already completed a contract for the purchase of over 120 acres on the Delaware River at Camden, N. J., opposite Philadelphia, for the proposed plant, the water frontage of which is 3,500 ft. There will be nine buildings, as follows: One brick and iron building, one story high, 92 x 180 ft.; one brick and iron building, one story high, 156 x 557 ft.; one brick and iron building, one story high, 184 x 557 ft.; one brick and iron building, one story high, 412 x 940 ft.; one brick and iron building, one story high, 50 x 100 ft.; one brick and iron building, one story high, 115 x 130 ft.; one wooden building, one story high, 60 x 200 ft.; one wooden building, one story high, 50 x 150 ft.; one wooden building, one story high, 50 x 132 ft. Over 7,000 tons of steel have been bought for the buildings, 3,000 tons of which have been delivered at the Pottstown Bridge Company's works, which concern is now owned by persons interested in the shipbuilding company.

CHESTER, PA.—The Pennsylvania Steel Casting Co., according to report, will build extensions to some of the shops.

CHICAGO, ILL.—Bids are wanted July 25 for a new building for the University of Illinois. See notes on "Technical Schools."

Washington dispatches say that the Supervising Architect of the Treasury Department let a contract July 7 for the annex to the temporary Post Office on Michigan Ave., Chicago, to the Congress Construction Co., of that city, whose bid was the only one within the appropriation. The bid was \$32,823, the work to be completed within 90 days.

CINCINNATI, O.—The Union Savings & Trust Co. will build a 17-story office building, 106 ft. on Fourth St. and 97 ft. on Walnut St., work to be begun about Oct. 1.

Reports state that plans are being prepared for a large new hotel in Cincinnati. The structure, according to report, will be ten stories in height and of steel skeleton.

The Stewart Iron Works, according to report, has prepared plans for the enlargement of the plant. The company makes architectural iron work.

COUNCIL BLUFFS, IA.—The Chicago, Rock Island & Pacific is making arrangements for a new round house at Council Bluffs, large enough for the accommodation of 20 or more engines. A new machine shop will also be put in at the same point, for which a building 40 x 80 ft. will be built, according to report.

DES MOINES, IA.—We are informed that although the Chicago, Rock Island & Pacific is considering building a new depot at this place, the matter is as yet premature and perhaps nothing will be done until next year.

DULUTH, MINN.—The managers of St. Luke's Hospital have decided to erect a new building, to cost \$30,000.

DURAND, MICH.—We are informed that it is probable that a general passenger station will be built at Durand by the Grand Trunk and the Ann Arbor railroads. The work will probably be begun so as to enclose the structure before January, 1900. The new building will probably cost \$30,000.

EAST ST. LOUIS, ILL.—The Terminal Associa-

tion of East St. Louis, Ill., has evidenced a determination to build a new passenger station at East St. Louis to replace the old "Relay Depot." At a recent meeting of the Terminal Directory it was decided to build a \$200,000 station of brick, terra cotta and iron, on land to be bought from the Vandallia Line. The Railroad Commission, July 5, received the report in which it was promised that work will be begun on the new station as soon as some minor details of the sale are consummated. There will be three tracks on the west side of the station for the accommodation of Northern lines, and two or three tracks on the east side for the accommodation of Eastern and Southern lines.

EVERETT, WASH.—Reports state that in connection with the purchase of iron mines on the Pacific Coast by the J. D. Rockefeller interests, a blast furnace will probably be built at Everett.

FLORENCE, ALA.—A new court house to be erected at this place will cost \$15,000.

GOLDEN, COL.—School bonds will soon be sold for new buildings.

JEFFERSONVILLE, IND.—Proposals are wanted by the General Superintendent of the Indiana Reformatory until Aug. 1 for furnishing material and building a new cell house of 600 cells.

LONG ISLAND CITY, N. Y.—We are informed that plans are being prepared for the new freight terminal on Newton Creek by the Long Island RR., but the plans are not far enough advanced to be considered. Reports state that the terminal will occupy 160 acres.

NEW MARTINSVILLE, W. VA.—George A. Burt, Vice-President and General Manager of the Ohio River RR., is reported as stating that the company will build a new roundhouse, shops, etc., at this place, some of the buildings to have steel framework.

NEW ORLEANS, LA.—The Mechanics' Electric Light & Power Co. is building a fire-proof power house for which the Weston Electric Co. has the contract for electrical equipment.

NEW YORK, N. Y.—No place has as yet been decided upon for the plant of the Gruson Iron Works, although several plans are under consideration, and when a decision is arrived at work on the plant will be begun. A. E. Piorkowski, 31 Nassau St., is Secretary.

Reports state that plans are under way for building an annex to the Waldorf-Astoria.

Plans and specifications have been submitted to the Department of Buildings for a one and two-story brick and granite fireproof electric power house, to be built for the Third Avenue Railroad Co., at the northeast corner of Ninth Ave. and 216th St., from plans prepared by Westinghouse, Church, Kerr & Co., engineers, who estimate the cost of construction at \$1,000,000. The building will have a steel frame.

Farson, Leach & Co. received the entire issue of municipal bonds of \$10,025,000 recently issued by the city, their bid being 109.45. In our issue of June 30, p. 481, the various uses for the money was reported.

Plans have been filed with the Building Department for the improvements to be made to the Grand Central Station on the Vanderbilt Ave. and Depew Place sides. Cost, \$300,000.

The Society of Lying-In Hospital has filed plans for a nine-story hospital building on Second Ave. and 18th St., which will cost \$800,000. The plans, which were prepared by R. H. Robertson, provide for a brick, terra cotta and limestone structure with a steel frame, and to be thoroughly fireproof. It will have a frontage of 184 ft. on the west side of 2d Ave., 82.11 ft. in 17th St., and 165 ft. in 18th St.

NORWICH, CONN.—The Treasury Department is advertising for land in Norwich upon which to build a public building.

OAKLAND, CAL.—The West Oakland Improvement Club wants an appropriation of \$40,000 from the Council for a wharf from 12th St. 600 ft. long and 100 ft. wide, extending to deep water in the bay. W. H. Watkins may be addressed.

PHILADELPHIA, PA.—Reports state that Chas. McCaul has the contract for building the three-story engine and boiler house on Susquehanna Ave. for the Pennsylvania Manufacturing, Light & Power Co. It will be 121 x 54 ft. Plans were prepared by James H. Windrim.

The Baldwin Locomotive Works has torn down the building at Sixteenth and Buttonwood Sts. and built a new structure. The new building is a two-story brick and iron structure, 163 x 100 ft., and will be used as a flange shop. The company will have attached a boiler room with 1,000 h. p.; also pumps, accumulators, dynamos, cranes, etc., constituting a first-class plant.

Reports state that Hales & Ballinger are preparing plans for a group of mill buildings for the Consolidated Oldham Upholstery Co., of Paterson, N. J., and the Chauncey Tapestry Co., of Chauncey, N. Y. The estimate for the work is between \$50,000 and \$75,000. Bids will soon be asked for the material.

William Steele & Sons will build three one-story buildings for the American Pulley Company at 29th and Bristol Sts. They will be on steel columns, with steel trusses and brick curtain walls. One will measure 50 x 60 ft., one 150 x 180 ft. and one 100 x 180 ft. The estimated cost is \$42,000.

PHOENIXVILLE, PA.—The Phoenix Bridge Co., according to report, is negotiating for a lease of the old Bellefonte Nail Works, which it will rebuild.

PITTSBURGH, PA.—It is reported that David Carlin, C. C. Henry and R. Solomon have applied for the incorporation of the North Pittsburgh Foundry & Steel Co. They propose to buy and rebuild the plant of the Carlin Manufacturing Co., in Allegheny, which was recently destroyed by fire.

Henry Schenck, of Erie, Pa., according to report, has the contract for the superstructure of the new station to be built by the Pittsburgh & Lake Erie RR., and which will probably cost \$300,000.

PLAINWELL, MICH.—Reports state that J. E. Botsford is interested in a project to build a water power plant near this place. The buildings will be located on the north bank of the river and will be 50 x 150 ft. W. R. Coates of Grand Rapids is the Chief Engineer.

PROVIDENCE, R. I.—Reports state that the Brown & Sharpe Manufacturing Co. will soon increase the size of the plant by the addition of a foundry and a large four-story brick building to be used as a machine shop.

RANKIN, PA.—A plant for the manufacture of cold rolled steel shafting, it is reported, will be built by a number of capitalists, among whom is Thomas W. Fitch, Jr., of Braddock.

ST. JOSEPH, MICH.—A new factory will be built by the Western Book & Paper Co., according to report.

ST. LOUIS, MO.—Articles of incorporation have been filed by the Scullin-Gallagher Iron & Steel Company to build a large, complete steel plant in the West. The capital stock of the company is \$500,000, but it is said it will be increased to \$5,000,000. John Scullin, the street railroad magnate; Harry Scullin, his son; Thomas M. Gallagher, and others are interested.

SOUDERTON, PA.—The Inland Traction Co., according to report, has prepared plans for the proposed power house. Address J. H. Pascoe, Allentown, Pa.

SYRACUSE, N. Y.—Frederick E. Le Strange, of Syracuse, according to report, has the contract for the proposed new penitentiary at Jamesville, at \$191,954. The other bidders were: Champion Iron Co., \$193,780; Van Dorn Iron Co., \$239,000; O'Brien & Hoolihan, of Syracuse, \$212,164; C. & L. Merrick, Syracuse, \$213,956; A. Van Wagner & Co., Syracuse, \$227,315; Pauly Jall Building & Manufacturing Co., of St. Louis, \$227,000; Jeremiah H. Leamy, Syracuse, \$229,953; William Sherlock, Syracuse, \$231,425.

TARRYTOWN, N. Y.—The Stanley Locomobile Co., of Boston, Mass., of which A. L. Barber is president and John Brishen Walker, owner of the "Cosmopolitan Magazine," Irvington, is vice-president, will, according to reports, build several factory buildings at this place. A building 400 ft. long and 50 ft. wide will be built with iron framework.

TROY, ALA.—The plans for the new union depot are in the hands of the Mayor of Troy. Iron bridges will span Elm and Church Sts. Work will be begun when additional right of way is secured.

WILMINGTON, DEL.—Reports state that the contract for the new dry dock for Wm. H. Skinner & Sons Ship Building & Dry Dock Co. has been awarded to the Delaware Construction Co., and that the entire structure will cost \$300,000.

The Wilmington & Brandywine Springs Electric Ry., according to report, will enlarge its power house and install additional machinery.

YEADON, PA.—Plans have been prepared for the boiler, engine house and car barn for the Midland St. Ry. by Engineer J. D. Lalor. The buildings will be of steel and galvanized iron and the size of the boiler and engine house is 60 x 50 x 100 ft., and the car barn 50 x 160 ft.

YOUNGSTOWN, O.—Reports state that the officials of the Republic Iron & Steel Co. have authorized improvements at the mills in Youngstown, O., and at Sharon and New Castle, Pa.

PERSONAL

(For other personal mention see Elections and Appointments.)

—Mr. George W. Morris, who was for many years connected with the A. French Spring Co., died at his home in Shadyside, Va., last Saturday evening, having been sick only since the preceding Wednesday. Although Mr. Morris had not been in active business for some time, yet he attended the conventions this year at Old Point. He had a wide acquaintance with railroad men, and the news of his death will be much regretted.

—Capt. Stephen A. Gardner, General Superintendent of the Marine District of the New York, New Haven & Hartford RR., died suddenly at Stamford, Conn., July 9. Mr. Gardner was born in 1844, and at the age of 21 was made Master of a vessel. In 1890 he became Superintendent of the Fall River Line, and in 1898 Superintendent of the Marine District of the N. Y., N. H. & H. RR., which embraces the Fall River, Providence, Norwich and Stonington Lines. This position Mr. Gardner held at the time of his death.

—Mr. George C. Dressel, President of the Dressel Railway Lamp Works, of New York, died July 3. He was born in Germany in 1828, and learned the trade of coppersmith. He came to this country when he was still a young man and entered the employment of the New York & Harlem Railroad, where he remained for 18 years. In 1881 he began the manufacture of railroad signal lamps. He was one of the early members of the Railroad Branch Young Men's Christian Association, and took an active interest in its affairs.

—Mr. Richard S. Buck, M. Am. Soc. C. E., has been appointed a Chief Engineer in the Department of Bridges in New York City, and has special charge for the present of work on some of the proposed bridges between New York and Brooklyn. Mr. Buck was the Resident Engineer in charge of the Grand Trunk Railroad bridge recently built at Niagara Falls, and later Resident Engineer in charge of the building of the 840-ft. arch which replaced the Upper Suspension Bridge, both of these under Mr. L. L. Buck as Chief Engineer. Still later Mr. R. S. Buck as Chief Engineer built the suspension bridge across the Niagara River at Lewiston. As Chief Engineer in the Department he does not succeed either Mr. Probasco or Mr. L. L. Buck, all of the duties of these gentlemen being independent and well defined.

—Mr. Cornelius Vanderbilt, Jr., received last month the degree of Mechanical Engineer from the Sheffield Scientific School, Yale University. In 1895 he received from Yale the Bachelor of Arts degree and after two years of practical railroad work took up the scientific course, receiving the Bachelor of Philosophy degree in 1898, and after taking the prescribed course received at the last commencement the degree of Mechanical Engineer. At Yale, the engineering degrees are given only to those taking the prescribed courses for at least one year after the Ph. B. degree. This plan, which is also followed in some other universities, puts the engineering studies in practically a post-graduate course. The past year Mr. Vanderbilt has been carrying on his engineering studies in addition to his duties in the motive power department of the New York Central & Hudson River Railroad, and credit was given at the Sheffield Scientific School for some of his engineering work on the railroad. He is about to take up again work in the civil engineering department of the road. Mr. Vanderbilt has shown actual me-

chanical ability and has had a good deal to do with the designs and details of the latest locomotives built for the New York Central. He has taken a serious interest in the work of the motive department and has been a conscientious employee of that department.

ELECTIONS AND APPOINTMENTS.

Arkansas Central.—C. E. Ratcliff, Auditor and General Freight and Passenger Agent of the Arkansas & Louisiana at Washington, Ark., has been appointed Receiver of the A. C., succeeding Wm. Blair, resigned.

Atchison, Topeka & Santa Fe.—We are officially informed that the duties of Mr. James M. Barr will be more comprehensive than those of the late assistant to the President, whose work was largely of a special and technical character. Mr. Barr will have direct charge, under the President, of all the lines in the Atchison system, practically taking the place of Mr. D. B. Robinson, whose office has been vacant since his retirement to go to the "Frisco" as President. The office of Third Vice-President of the Atchison has been created for Mr. Barr. No successor to Mr. Higginson has yet been selected.

Avoyelles.—Henry Flanders, formerly Division Superintendent of the Southern Pacific, has been appointed Vice-President and General Manager, succeeding N. G. Pearsall, resigned.

Belfast & Moosehead.—John Brooks was elected a Director, succeeding F. B. Matthews, deceased.

Birmingham Southern.—L. Long has been appointed Auditor and Traffic Manager.

Boise, Nampa & Owyhee.—E. H. Dewey has been appointed Vice-President and General Manager, with headquarters at Nampa, Ida.

Buffalo, St. Marys & Southwestern.—Geo. C. Woolard has been appointed Engineer Maintenance of Way.

Calvert, Waco & Brazos Valley.—The officers of this company, referred to in the construction column, are: President, George Gould, New York; First Vice-President, Leroy G. Trice, Palestine, Tex.; Second Vice-President, L. P. Parish, Calvert, Tex.; and Secretary, Treasurer, Auditor and General Claim Agent, J. W. Byers, Calvert, Tex.

Carrabelle, Tallahassee & Georgia.—F. W. Armstrong, Auditor, will also assume the duties of General Freight and Passenger Agent. Effective July 1.

Central Branch.—The Directors of this company, referred to in the railroad news column, are: C. G. Warner (President), St. Louis; B. P. Waggener, James W. Orr and C. M. Rathburn, of Atchison; H. B. Hensen, C. E. Satterlee and Lawrence Greer, of New York.

Central RR., of New Jersey.—Charles Register has been appointed Master of Bridges, in charge of Bridges, Docks and Masonry on Central, Lehigh and Susquehanna Divisions.

Chicago & Alton.—J. E. Gray, Superintendent of Bridges, with headquarters at Bloomington, Ill., has resigned.

Chicago & Eastern Illinois.—W. H. Jackson has been appointed Assistant General Superintendent. George H. Trenary has been appointed Division Superintendent, with headquarters at Brazil, Ind., succeeding H. B. Harper, transferred.

Chicago Great Western.—Tracy Lyon, heretofore Master Mechanic, has been appointed General Superintendent, succeeding R. Du Puy, resigned.

Chicago, Rock Island & Pacific.—Charles Kennedy has been appointed Assistant General Passenger Agent, succeeding E. E. MacLeod.

Clarion River.—Geo. C. Woolard has been appointed Engineer Maintenance of Way.

Cleveland, Cincinnati, Chicago & St. Louis.—Wm. Quinn, Division Superintendent at Springfield, O., has resigned.

Colorado Midland.—Anthony Sneve has been appointed General Freight Agent, with headquarters at Denver, Col., succeeding A. P. Tanner, resigned.

Delaware, Lackawanna & Western.—Raymond Du Puy, heretofore General Superintendent of the Chicago Great Western at St. Paul, Minn., has been appointed Division Superintendent of the D., L. & W., with headquarters at Hoboken, N. J. T. W. Lee has been appointed General Passenger Agent, succeeding W. F. Holwill, resigned.

East Louisiana.—J. M. Burford has been appointed Master Mechanic, with headquarters at New Orleans, La. Adolph Poitevent, Superintendent, has resigned, and that office has been abolished. Effective July 1.

Florence & Cripple Creek.—A. C. Ridgway, heretofore Superintendent at Florence, Col., has been appointed General Superintendent. C. F. Elliott, heretofore General Traffic Agent at Denver, Col., has been appointed Traffic Manager. R. D. Stewart, heretofore Resident Engineer at Florence, Col., has been appointed Chief Engineer.

Grand Trunk.—W. W. Ashald has been appointed Trainmaster of the First and Third Districts, and of the Second District between Richmond and Island Pond, Vt., succeeding C. S. Cunningham, resigned. P. J. Lynch has been appointed Trainmaster of the Sixth and Seventh Districts, with headquarters at Belleville, Ont., succeeding W. W. Ashald. D. J. O'Connor has been appointed Acting Trainmaster of 22-23-24 Districts, succeeding P. J. Lynch, with headquarters at Stratford, Ont.

Jacksonville & Southwestern.—J. K. McIver has been appointed Auditor and G. L. Davis Chief Engineer, with headquarters at Jacksonville, Fla.

Long Island.—J. E. Read has been appointed Principal Assistant Engineer, with headquarters at Long Island City, N. Y.

Mansfield Short Line.—R. M. Barbour has been elected Secretary of M. S. L., which is now building, succeeding Ed. H. Zurhorst, resigned.

Missouri, Kansas & Texas.—J. A. Davis, heretofore Assistant Superintendent, has been appointed Superintendent, with headquarters at Sedalia, Mo., succeeding Wm. B. Lyons, deceased.

Millen & Southwestern.—Frank R. Durden has been appointed General Manager, with headquarters at Monte, Ga.

Nashville, Chattanooga & St. Louis.—Charles F. Frizzell, Assistant Auditor of Receipts, has resigned.

Norfolk & Western.—L. E. Johnson, heretofore General Superintendent, has been appointed General Manager, succeeding James M. Barr, resigned. Effective July 15. James C. Cassell, Division Superintendent at Roanoke, Va., will probably succeed Mr. Johnson as General Superintendent.

North Shore Terminal.—The officers of this company are as follows: President, Charles T. Schoen; Vice-President, W. H. Schoen; Treasurer, W. O. Jacques; Auditor, A. R. Fraser; General Manager, E. A. Schoen; Purchasing Agent, L. W. Jones; Traffic Manager, Bryan Robertson. All of Pittsburgh, Pa.

Omaha, Kansas City & Eastern.—A. J. Bandy has been appointed Assistant General Passenger Agent.

Pennsylvania.—H. S. Laird has been appointed Assistant Supervisor of the Pittsburgh Division, with headquarters at Pitcairn, Pa., succeeding C. R. McMillan.

Pine Bluff & Western.—The officers of this company referred to in the construction column are: President, W. E. Sawyer, La Crosse, Wis.; Vice-President, F. H. Head, Pine Bluff, Ark.; Treasurer, J. H. MacMillan, La Crosse; Superintendent, T. F. Doyle, Sheridan; Chief Engineer, L. M. Davis.

Plant System.—At a meeting of the stockholders held July 3, the following officers were elected: President, R. G. Erwin; Vice-President, M. F. Plant. President Erwin made the following appointments: Second Vice-President, F. Q. Brown; Assistant to the President, F. deC. Sullivan, and Assistant to the Treasurer, E. J. Loughman. R. G. Erwin was on July 3 elected President of the following subordinate lines of the P. S., Savannah, Florida & Western; Green Pond, Walterboro & Branchville; Silver Springs, Ocala & Gulf; Winston & Bone Valley, and Tampa & Thonotosassa. M. F. Plant was elected President of the Alabama Midland, and Lynde Harrison President of the Brunswick & Western.

Rio Grande Western.—G. W. Heintz has been appointed General Passenger Agent, with headquarters at Salt Lake City, Utah, succeeding F. A. Wadleigh, resigned.

Seaboard Air Line.—T. M. R. Talcott has been appointed Assistant to President Jno. S. Williams.

Sioux City & Western (Sioux City, O'Neill & Western).—The officers of this recently reorganized company are as follows: President, D. Miller; Vice-President, L. W. Hill; Secretary and Treasurer, E. Sawyer, St. Paul, Minn.; General Manager, F. C. Hills, Sioux City, Ia.; and Chief Engineer, Jno. F. Stevens, St. Paul, Minn.

Southern.—T. C. Powell, heretofore General Freight Agent at Washington, D. C., has been appointed Assistant Freight Traffic Manager, with headquarters at Louisville, Ky. E. A. Neil, heretofore Assistant General Freight Agent at Washington, D. C., has been appointed General Freight Agent, succeeding T. C. Powell. Edwin Fitzgerald, heretofore General Western Freight Agent, has been appointed Assistant General Freight Agent, with headquarters at Louisville, Ky.

Southern Express Co.—M. J. O'Brien was on July 10 elected President, succeeding H. B. Plant, deceased.

Texas & New Orleans.—H. C. Reese has been appointed Assistant General Freight Agent, with headquarters at Houston, Tex.

Washita Valley.—The officers of this company referred to in the construction column are: President, F. T. Cook; Vice-President, J. H. Dalton; Treasurer, W. H. Dean; Secretary, W. H. H. Cranford; General Attorney, Henry N. Berry, all of Cloud Chief, Okla.

Wisconsin Central.—The officers of this company, successor to the old company, are as follows: President, Henry F. Whitcomb, Milwaukee; General Counsel, Charles C. Beaman, New York; Counsel, Howard Morris, Milwaukee; Auditor, Robert Toombs, Milwaukee; Treasurer, Frederick Abbott, Milwaukee; General Superintendent, Sumner J. Collins, Milwaukee; General Freight Agent, Burton Johnson, Milwaukee; General Passenger Agent, James C. Pond, Milwaukee; Chief Engineer, Robert E. Tweedy, Milwaukee; Purchasing Agent, J. A. Whaling, Milwaukee. The Directors are: George Coppel, Chairman; John Crosby Brown, William L. Bull, Charles C. Beaman, Fred L. Gates, Gerald L. Hoyt, and James C. Colgate, New York; Francis R. Hart, Boston, and Henry F. Whitcomb and Howard Morris, of Milwaukee. (See RR. News column.)

Wisconsin, Michigan & Northern.—W. H. Howe has been appointed Auditor. Effective July 1.

RAILROAD CONSTRUCTION, New Incorporations, Surveys, Etc.

ALGOMA CENTRAL.—Representatives of towns along this proposed line appeared before Sir Wilfrid Laurier, the Canadian Premier, and other influential Government officials, urging the granting of a subsidy of 64,000 acres and \$3,200 per mile from the Dominion for this proposed line from Sault Ste. Marie north along the shore of Lake Superior to Michipocoten River, and thence to the Michipocoten Harbor. (April 21, p. 283.)

ARKANSAS & OKLAHOMA.—Grading is reported in progress on the extension of this line from Gavett, Ark., to Southwest City. The projected extension is to run 65 to 70 miles northwest. (March 31, p. 235.)

CALVERT, WACO & BRAZOS VALLEY.—This company was incorporated in Texas, June 28, with a

capital stock of \$75,000, to build a railroad from Lewis, on the International & Great Northern, north through Calvert to Waco, about 60 miles. The incorporators are: Leroy Trice, George L. Noble, N. A. Stedman, W. L. Maury, Alfred R. Howard, Howden Brummell, Mayer L. Collat, E. S. Peters, John T. Garrett and L. H. Parish. It is reported that contract is let for the section between Lewis and Calvert to be completed in 45 days. The I. & G. N. is understood to be back of the project.

CATSKILL & TANNERSVILLE.—Trains are running on the extension four miles at Otis Summit, N. Y. (March 31, p. 235.)

CHATAHOOCHEE & GULF.—A charter was issued to this company in Alabama on July 7 to build from Columbia, terminus of a branch of the Central of Georgia, to run west through Henry, Geneva, Covington and Escambia counties to Flomaton, on the Louisville & Nashville. The capital stock is \$1,000,000. The incorporators are: A. V. Lane, T. M. Cunningham, Isaac Haas, R. L. Pritchard, H. W. Johnson, George H. Richter, H. V. Jenkins of Savannah, Ga. (March 24, p. 217.)

CHICAGO & NORTHWESTERN.—The extension from Denison, Ia., northeast 24.7 miles to Wall Lake is to be ready for traffic this week. (June 30, p. 482.)

The company has decided, according to report, to build an extension from Moline, Ia., the present terminus of the Wall Lake & Moline division, to run west 18 miles to Sioux City, and thence to Centerville, S. D., 55 miles. Surveys were made to Sioux City several years ago, and the line is now being surveyed in South Dakota. It is stated that work is to be begun at once and the line completed this year. It will shorten the distance from Sioux City to Chicago over the line by 25 miles. (Feb. 3, p. 92.)

CHICAGO, FORT MADISON & DES MOINES.—Surveys are in progress for an extension from Ottumwa, Ia., west about 50 miles to Indianola. It is stated that the entire line will be surveyed from Indianola northwest to Des Moines. The people of Indianola have been given to understand that a portion of the line is to be built this year.

CHICAGO, MILWAUKEE & ST. PAUL.—Surveys are reported in progress for a cut-off from Clinton, Ia., southeast through Davenport to Ottumwa. When completed, this will shorten the distance by many miles to Kansas City.

CHICAGO, ROCK ISLAND & PACIFIC.—Surveys are reported in progress for an extension of the Guthrie Center branch from Guthrie Center, Ia., to Carroll. It is rumored that it is to be extended beyond Carroll to Sioux City, and possibly into South Dakota.

The company has also decided to build from Gowrie on the Des Moines-Ruthven branch in Webster County, Ia., to run northwest 115 miles through Webster, Calhoun, Pocahontas, Buena Vista, Clay and Osceola counties to Sibley on the Sioux Falls division of the Burlington, Cedar Rapids & Northern. The line was surveyed last spring. Grading will be begun as soon as contracts are let.

COLORADO SPRINGS & CRIPPLE CREEK.—This company has been incorporated in Colorado, with a capital stock of \$2,000,000, to build a direct line from Colorado Springs west about 25 miles to Cripple Creek.

DAHLONEGA.—This company has been incorporated in Georgia with a capital stock of \$300,000, to build a railroad from Dahlonega southeast about 20 miles to Gainesville or Lula on the Southern. Among the incorporators are: J. W. Adams, of Chattanooga; J. W. Smith, of Michigan; George H. Breyman and Frank G. Thompson, of Ohio, and W. P. Price and W. A. Charters, of Dahlonega.

DALLAS, FORT WORTH & GULF.—W. P. Conner, President of this company, successor to the Dallas Terminal Ry. & Depot, has asked the people of Dallas, Tex., to subscribe for \$20,000 of the stock, and states that the enterprise can be floated in New York provided this subscription is made. The company proposes to extend its line from Dallas to Fort Worth, 31 miles. (Jan. 20, p. 52.)

DANSVILLE & MT. MORRIS.—This company proposes to build an extension from Dansville, N. Y., south about eight miles to Burns, on the Erie. (Official.)

DENVER & RIO GRANDE.—Grading is in progress on the cut-off from a point on the main line west of La Veta, Col., to Wagon Creek, east of Alamosa, 25.8 miles. Clough & Anderson of Colorado Springs, Col., Levi McDonald of Walsenburg, and Dunphy & Nelson of La Veta have the contract. (Jan. 27, p. 72.)

DETROIT RIVER TERMINAL & RAILROAD.—This company was incorporated in Michigan July 8, with a capital stock of \$500,000, to build a terminal line to run from Detroit south 16 miles to Slocum Junction, on the Lake Shore & Michigan Southern and the Detroit & Lima Northern.

DULUTH, SOUTH SHORE & ATLANTIC.—Surveys are reported in progress for an extension from Houghton, Mich., southwest about 45 miles along the lake shore to Ontonagon.

ERIE.—This company will raise its tracks at Montclair, N. J., on the Valley Road, to permit a trolley line passing under.

GOWRIE & NORTHWESTERN.—This company has been incorporated in Iowa, with a capital stock of \$1,000,000, to build the branch of the Chicago, Rock Island & Pacific from Gowrie, Ia., referred to above. The incorporators are officials of the C., R. I. & P.

ILLINOIS CENTRAL.—Surveys are reported in progress for an extension from Leland, Miss., southeast about 30 miles across the Bogue Phalia River to Murphy.

Press reports from Mississippi state that this company has obtained possession of the Rosedale & Mississippi Central Valley RR., which runs from Rosedale east 6.5 miles to Phalia, and that the line is to be made standard gage and extended on to the main line, some 15 miles.

IOWA CENTRAL.—Grading and track laying are in progress for the Iowa Central & Western extension

from Belmond, Ia., northwest 28 miles to Algona. The company expects to have trains running to Corinth, on the Minneapolis & St. Louis, by Aug. 1. (April 7, p. 253.)

KANE.—This company, recently incorporated in Pennsylvania to build from Kane, Pa., northeast 11 miles to Mt. Jewett, is surveying for the new line. Elisha P. Kane of Kusehequa, Pa., is President.

KANSAS CITY, FORT SCOTT & MEMPHIS.—With reference to the improvements on the Arkansas side near Memphis, Tenn., the General Manager writes that the extension of the St. Francis levee across the company's track at Four Mile Bayou makes it necessary to raise the track from that point to the Memphis bridge, about 1 1-2 miles, to correspond with the levee, and this work is in progress. (June 30, p. 483.)

KANSAS CITY, PITTSBURGH & GULF.—Press reports state that it has been determined to extend the line from Port Arthur, Tex., south to Sabine Pass. The line will be built under a new incorporation, but practically will belong to the K. C., P. & G.

KENTUCKY WESTERN.—The new railroad through Webster County, Ky., noted last week under Kentucky Roads (p. 499), is to be built under the above title. The Southern Construction Co. of St. Louis has the contract from Dixon to Blackford, on the Illinois Central.

LAKE ERIE & DETROIT RIVER.—The people of St. Thomas, Ont., on June 30 defeated the by-law to grant this company a subsidy of \$20,000 to extend its line from Ridgeway, Ont., northeast 50 miles to that city. The company will build the line without the bonus, as it will make another connecting link between Lake Huron and Lake Erie. The company has lately acquired the Erie & Huron, and is lessee of the London & Port Stanley, which connects at Port Stanley by ferry with Conneaut, O. (May 19, p. 359.)

LINVILLE RIVER.—Track is laid from Cranberry, N. C., to Pineola, 14 miles. (April 28, p. 305.) It is proposed to extend it to Lenoir, N. C., 22 miles more. (Official.)

MANSFIELD SHORT LINE.—The directors met recently at Shelby, O., and decided to hasten this road to completion within the next 90 days. It is projected from Shelby northwest about 20 miles via Mansfield to Lucas, and much of the line is graded. C. W. French of Mansfield is President. (Oct. 21, 1898, p. 768.)

MILWAUKEE TERMINAL & WESTERN.—An ordinance is before the Milwaukee Council to give this company right of way into the city from the south. The company proposes to build southwest about 200 miles from Milwaukee. D. M. Edgerton of Kansas City and J. W. Wegner of Milwaukee are interested.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—Contract is let, according to report, for building a branch from Rapid River near Gladstone, to run northwest about 30 miles through timber and agricultural lands.

MONTANA ROADS.—The Nelhart, Mont., City Council has granted the Diamond R Mining Co. right to build a spur from the Montana Central line of the Great Northern to its property.

MUSKOGEE, OKLAHOMA & WESTERN.—The entire line has been surveyed from Enid, Okla., west 200 miles to Tahlequah, I. T., with branches from Muskogee, I. T., southwest 215 miles to Texarkana, Ark., and from Muskogee south 312 miles to the north fork of the Red River. Contract is let for grading from Fort Gibson, I. T., to Muskogee, 10 miles. The section of 70 miles of the western end from Pawnee, Okla., east to Tulsa, will be under the title of the Pawnee & Arkansas Valley (which see below). W. H. Herbert of Cleveland, O. T., is General Manager. (Official.)

NATCHITOCHES & GRANDECORE RAILWAY & BRIDGE.—This company has been organized in Louisiana to build a railroad and bridge across the Red River at Grandecore. Simcoe Walmsley of Natchitoches is Secretary.

NORFOLK & WESTERN.—This company is building the line from Damascus, Va., to Abingdon, noted last week (p. 499) under Abingdon & Damascus.

NORTHERN PACIFIC.—T. R. Henry, of Seattle, Wash., and Nelson Bennett, of Tacoma, have been awarded the contract for the cut-off from Palmer, near Seattle on the main line, west 22 miles to Auburn. (June 30, p. 483.)

OMAHA, KANSAS CITY & EASTERN.—E. C. Collins of Kirksville, Mo., is surveying for the extension from Quincy, Ill., to Springfield. The party has reached Jacksonville. Right of way is secured and preparations are being made for grading at the Springfield end of the line. The Missouri Construction Co. has charge of the work. The extension is for a connecting line to the east.

OREGON RAILROAD & NAVIGATION.—Hale & Smith, of Portland, Ore., are reported to have the contract for building the Clearwater Valley extension from Riparia, Wash., east 71 1/2 miles to Lewiston.

OREGON SHORT LINE.—Bids have been received and contracts will be let as soon as negotiations for the right of way are completed for the St. Anthony branch from Idaho Falls, Id., northeast 39 miles to St. Anthony, on the Snake River. (June 30, p. 483.)

OSHKOSH & STEVENS POINT.—New articles of incorporation were filed in Wisconsin, July 5, for this line, from Stevens Point southeast about 70 miles to Oshkosh. It is stated that right of way has been surveyed and grading will be begun shortly. The incorporators are A. L. Thompson, A. E. Thompson and Col. H. B. Harshaw. (June 30, p. 483.)

PAWNEE & ARKANSAS VALLEY.—This company was incorporated in Oklahoma Territory, July 5, with a capital stock of \$100,000, to build the Muskogee, Oklahoma & Western line from Pawnee east 70 miles to Tulsa, I. T. The incorporators are: C. W. Rambo, J. D. Sheppard, H. C. Hanna, Robert Chastain, O. N. Lancaster, I. K. Berry, W. L. Eggleston, C. J. Sheppard, N. C. Horton, all of Pawnee; John R. Skinner, of Blackwell; G. W. Sutton and W. H. Herbert, of Cleveland.

PENNSYLVANIA.—Grading is reported in progress at Brownsville, Pa., on the extension up the Monongahela River from West Brownsville south 52 miles to Morgantown, W. Va. (April 7, p. 253.)

PENNSYLVANIA COMPANY.—Orders have been given, according to report, for building about 160 miles of second track this summer on the Pittsburgh, Fort Wayne & Chicago between Dunkirk, O., and Chicago. The sections to be built are from Dunkirk to Lafayette, O., from Elida, O., to Adams, Ind., and from Winslow, Ind., to Wanatah.

PENSACOLA & ANDALUSIA.—This line, which runs from Moline, Fla., northeast 30 miles, is being extended three miles more.

PINE BLUFF & WESTERN.—The Arkansas Construction Co. has the contract for building this line from Pine Bluff west about 25 miles to Sheridan. Work is just begun with 500 men. The maximum grade is one per cent. The company has bought its rails, which are to be of 60-lb. weight. (June 30, p. 483.) The officers are given under Elections and Appointments. (Official.)

PITTSBURGH, JOHNSTOWN, EBENSBURG & EASTERN.—This company has acquired the Altoona & Beech Creek, giving it a connecting line between Altoona, Pa., and Phillipsburg. Work is to be begun at once for an extension from Phillipsburg to Johnstown, about 60 miles.

PORT INGLIS TERMINAL.—This proposed line from the mines of Dunnellon Phosphate Co., Fla., to the Withlacoochee River, 14 miles, is reported completed. Ralph Baker of Rockwell, Fla., is Secretary.

RICHMOND, PETERSBURG & CAROLINA.—Track is reported laid for six miles south from Lacrosse, Va., in Mendenhall County, and one mile north. The road has been graded from Ridgeway, N. C., to the Roanoke River, 10 miles, and grading is to be completed by Butterworth, the present terminus, to Lacrosse by August next. This property is now controlled by the Seaboard Air Line. (June 16, p. 439.)

RUMFORD FALLS & RANGELEY LAKES.—The Maine State Railroad Commission has granted this company permission for its proposed extension northward from its terminus at Bemis. (July 7, p. 500.)

ST. LOUIS, PERRY & CHICAGO.—Moulton & Keene of 659 Houser Building, St. Louis, Mo., write that while there is nothing now to report as to building this line, the outlook seems to indicate that work will be under way during the next four months or perhaps in a shorter time. The road is to run from Grafton, Ill., to Macomb, 150 miles. (June 10, 1898, p. 421.)

SALT LAKE & OGDEN.—This company will extend its line from Farmington north 20 miles to Ogdens, Utah. (Official.)

SEABOARD AIR LINE.—The rails, 80-lb. weight, have been bought for October delivery for the extension from Cheraw, S. C., southeast to Camden. The company expects to have it completed by Dec. 15, and to begin operating trains not later than Jan. 1. (July 7, p. 500.)

SIERRA OF CALIFORNIA.—A branch will be built, according to report, from Jamestown, Cal., northwest eight miles to Angel's Camp.

SOUTHERN.—Work is to be begun at once, according to report, on the \$5,000,000 tunnel through Lookout Mountain, for the extension from Chattanooga, Tenn., southwest about 40 miles to Stephenson, Ala. This tunnel will be three miles long. (June 9, p. 418.)

TENNESSEE, EASTERN & WESTERN.—This company has been organized in Tennessee to build a line from Memphis to Knoxville. Edwin Woods, of Chicago, head of the organization, is reported to have disposed of \$12,000,000 of construction bonds to Boston capitalists.

TENNESSEE ROADS.—The New England Tanning Co. of Maryville proposes to build an extension of the Knoxville & Augusta line of the Southern from Maryville south about 10 miles to timber lands in the Chilhowee Mts. Surveys have been made as far as Gamble's Store.

TEXAS CENTRAL.—Track laying is begun on the extension from Albany, Tex., northwest 40 miles to Stamford. The company expects to have it completed to that point within the next 90 days. (June 23, p. 462.)

TRINITY VALLEY.—This company, whose incorporation on June 27 in Texas was recently noted (June 30, p. 484), proposes to build a line from Dodge on the International & Great Northern, to run southeast 90 miles through Walker, San Jacinto, Polk, Liberty, Hardin and Jefferson counties to Beaumont. The incorporators are: J. T. Carey, J. T. Pinkley, J. G. Nepper, Jno. Roark and Robert Bish, Dodge, Tex.; C. N. Carey and D. J. Young, Chicago, Ill.; E. J. Denpre, Crockett, Tex.; S. A. McMeams and S. J. Harris, Palestine, Tex.

URSINA & NORTH FORK.—A branch is proposed from Red House, Pa., to Summit Place, two miles. (Official.)

VIRGINIA & SOUTHWESTERN.—About six miles of grading is completed and rail laying is to be begun at once on the Bristol, Elizabethton & North Carolina from Elizabethton, Tenn., to Stony Creek, 16 miles. (June 30, p. 484.)

WABASH.—Contracts are let and work in progress on this line from Moulton, Ia., north 23.3 miles via Udell, on the Chicago, Rock Island & Pacific, and Moravia on the Chicago, Milwaukee & St. Paul, to Albia. The J. A. Ware Construction Co., of St. Louis, Mo., has the contract. (June 23, p. 462.) The maximum grade is 30 ft. per mile and the maximum curvature 2°. There are no bridges of importance. (Official.)

WABASH, CHESTER & WESTERN.—This company is considering an extension from Clearville, Mo., opposite the terminus of the line at Chester, Ill., to run west 60 miles to Irondale, on the St. Louis, Iron Mountain & Southern line of the Missouri Pacific. (Official.)

WASHITA VALLEY.—This company was incorporated in Oklahoma, June 28, with a capital stock of \$100,000, to build a railroad from a point on the

Chicago, Rock Island & Pacific, to run northwest through the counties of Washita, Custer and Mills, in Oklahoma, about 100 miles. The principal office is Cloud Chief, Okla. The officers are given under Elections and Appointments.

WEST BRANCH VALLEY.—Locating surveys are reported completed for this line from Clearfield, Pa., on the Buffalo, Rochester & Pittsburgh, to run east 104 miles to Williamsport on the Philadelphia & Reading. It is understood that this is an extension of the Buffalo, Rochester & Pittsburgh. A. E. Patton, of Curwensville, is President, and A. V. Hoyt, of Phillipsburg, Engineer in Charge. (Feb. 3, p. 93.)

WESTERN MARYLAND.—The track is being raised and straightened between Green Castle road and the passenger station at Hagerstown, Md.

GENERAL RAILROAD NEWS.

BALTIMORE & OHIO SOUTHWESTERN.—This property was sold at foreclosure at Cincinnati, O., on July 10, to E. R. Bacon, Geo. Hoadly, Jr., and J. Chauncey Hoffman, representing the reorganization committee, for \$3,510,000, which is \$10,000 above the upset price. (June 23, p. 462.)

BOSTON & ALBANY.—The terms of the lease of this company's property to the New York Central & Hudson River provide for the payment of 8% per annum, in quarterly installments, on the \$25,000,000 stock. A fund of \$4,000,000 in property and money, which has been set aside for improvements and special expenses, is to be reserved by the B. & A. for the benefit of its stockholders. This fund may be invested for annual dividends or possibly may be divided among the stockholders. The stockholders of the B. & A. will vote upon the lease Sept. 27. (July 7, p. 500.)

BOSTON & MAINE.—The Massachusetts Railroad Commission on July 10 granted a hearing with reference to the purchase of the Portsmouth & Dover on the basis of an exchange of 13 shares of the P. & D. for 10 of the B. & M., with approval for an increased issue of 5,915 shares of B. & M. to take up the \$679,000 of P. & D. stock. The B. & M. has already a lease of the road on the basis of 6 per cent.

Application was also made for approval of consolidation of the Portland, Saco & Portsmouth with the B. & M., which is a perpetual lease at 6 per cent. on its capital stock of \$6,000,000.

Application was also made for approval of the consolidation of the Portland & Rochester, a line not leased, but controlled, by the B. & M., which owns \$482,100 of its \$592,000 capital stock. It is proposed to exchange share for share, subject to the approval of the minority owners.

BUFFALO & SUSQUEHANNA.—Holders of first mortgage 5% gold bonds are notified that the sum of \$79,579 has been deposited with Harvey, Fisk & Co., New York, to buy these bonds, at a price not less than par and accrued interest. Sealed proposals are invited up to July 28.

CENTRAL BRANCH.—This company was incorporated in Kansas, July 7, with a capital stock of \$7,585,000, as successor to the Central Branch Union Pacific, the Atchison, Colorado & Pacific, and the Atchison, Jewell County & Western, now controlled by the Missouri Pacific. The officers and directors are given under Elections and Appointments.

CHESAPEAKE BEACH.—Ambrose C. Dunn, Vice-President of the Chesapeake Bay Construction Co., which built a portion of this line, filed a petition in the Supreme Court of the District of Columbia on July 3, asking that a temporary receiver be appointed to take possession of the property of the Construction Co., pending a dissolution of partnership and an accounting. The line runs from Washington, D. C., east 30 miles to Chesapeake Beach, Md., and is practically completed. (Railroad Construction, June 2, p. 393.)

COLUMBUS, SANDUSKY & HOCKING.—Judge Taft, of the U. S. Circuit Court at Cincinnati, O., on July 6, set aside the action of Judge Smalley at Bucyrus, O., May 25, under the State Court, appointing Nicholas Monsarrat Receiver of this property instead of the Federal Receiver, S. M. Felton. Under this decision Mr. Felton remains as Receiver. (June 2, p. 394.)

ILLINOIS CENTRAL.—(See Railroad Construction Column.)

MEMPHIS & CHARLESTON.—Simon Rothschild, J. S. Tilney and Alfred Sulley have consented to act as a committee to protect the minority interests of this property which was recently acquired by the Southern. Rolston & Bass, 16 Broad St., New York, will act as depository. Ten cents per share must be paid at the time of deposit, and all stock deposited on or before Aug. 1.

NORTHERN OF NEW JERSEY.—The new lease of this road to the Erie provides for the payment by the Erie of the interest on the \$654,000 6% bonds of the Northern on its general mortgage bonds when issued, and on the \$150,000 6% bonds of the Nyack & Northern; also dividends at the rate of 4% per annum on the \$1,000,000 stock. The lease further provides for the new issue of \$1,000,000 general mortgage bonds at interest not to exceed 4½% per annum, maturing in not less than 50 years, to the United States Mortgage & Trust Co. as trustee. Of this new loan \$804,000 will be reserved to retire the old bonds, and the remainder for improvements and betterments. (March 24, p. 220.)

PHILADELPHIA, READING & NEW ENGLAND.—An order has been issued in the United States Circuit Court at Hartford, Conn., that creditors of the old company, now the Central New England, must file their claims on or before Sept. 10. Failure to do so will bar the claim unless the claimant establishes his claim before the Superior Court within the first two weeks of the next term of the court. The Receiver is ordered to file a list of the claims presented within two weeks of Sept. 1, and to file a complete inventory and appraisal of all property on or before Aug. 1. (June 2, p. 394.)

Depositors of first mortgage income bonds and stock of the old company are notified that they will receive securities of the Central New England, the successor company, upon delivery of certificates of

deposit at the Fidelity Insurance, Trust & Safe Deposit Co., Philadelphia, on and after July 12. A syndicate offers to buy a limited amount of fractional scrip of the new securities on the following basis: General mortgage bond scrip, 55%; preferred stock scrip, 10%; common stock scrip, 5%.

PITTSBURGH, JOHNSTOWN, EBENSBURG & Eastern.—(See Railroad Construction column.)

RUTLAND.—This company has sold to E. H. Rollins & Sons \$1,100,000 of Rutland-Canadian 4% 50-year first mortgage gold bonds for building its extension from Burlington, Vt., north about 60 miles through Grand Isle to Alburgh. (Railroad Construction, June 23, p. 461.)

SIOUX CITY & WESTERN.—This company, successor to the Sioux City, O'Neill & Western, took charge of the property of the old company on July 1. It is now under the control of the Great Northern, and all the new officers except F. C. Hills, the General Manager, are officers of that system. The new officers are given under Elections and Appointments. (S. C., O. & W., June 30, p. 484.)

TOLEDO, ST. LOUIS & KANSAS CITY.—Judge Burton at Cincinnati, O., on July 5, confirmed the foreclosure decree rendered by Judge Taft in April, 1898, and held that the \$9,000,000 mortgage bonds were valid and that the Continental Trust Co., New York, was entitled to foreclose the same. This decision is subject to an appeal that may be made to the U. S. Supreme Court at Washington, but such appeal is not yet determined. (June 16, p. 440.)

WISCONSIN CENTRAL.—Special Master Hoyt, at Eau Claire, Wis., on July 7 sold this property to the Reorganization Committee for \$7,300,000. (July 7, p. 500.)

Judge Jenkins at Milwaukee, Wis., on July 9, confirmed the sale of this property. The decree provides that the payment of the remainder, amounting to \$6,100,000, may be made either in cash or in first mortgage bonds of the company, and upon payment the Special Master is authorized to execute the necessary deeds of conveyance. The officers and directors of the new company are given under Elections and Appointments.

TRAFFIC.

Traffic Notes.

The Interstate Commerce Commission held a hearing this week at Washington on the complaint of the Charleston (S. C.) Freight Bureau, alleging that rates from western points to that city are too high as compared with the rates to Norfolk. About 40 railroads are made defendants in the case.

It is reported that the internal revenue collector at New York City is going to compel a number of railroad companies, presumably all the principal lines in his district, to pay over to the Government a large amount of money to cover the deficiency arising from the failure of the roads to affix a 10 cent revenue stamp to bills of lading for goods going to Canada. It is alleged that these railroads have habitually stamped such bills with a one cent stamp, the same as though they were for domestic shipments.

The Southwestern Interchangeable Mileage Bureau has been established by the roads in the territory southwest of St. Louis, and commercial travelers and others who use mileage tickets will be dealt with under the credential plan, which has been in use for some time in other territory west of the Mississippi River. Regular travelers carry a "credential" and after having bought tickets at regular rates for 2,000 miles or more they are allowed a rebate sufficient to make their net rate 2½ cents a mile. In Colorado the net rate will be three cents a mile.

The local and soliciting freight agents in San Francisco have agreed that for one month they will not make allowance to shippers for the cost of telegrams ordering goods. If no agent falls from grace in that time it is hoped that a permanent stop can be put to this absurd practice.

The Merchants' Association of New York City announces that retail merchants visiting New York can buy round trip tickets at two-thirds regular fare as follows: From Southwestern territory, July 16-20 and Aug. 7-10, tickets good 30 days; from Central territory, Aug. 7-10 and Aug. 27-31, time limit 30 days; from Trunk Line territory, Sept. 1-4 and 10-14, time limit 15 days.

The New York Central now sells round trip tickets on the Rome, Watertown & Ogdensburg Division at 2½ cents a mile.

Press despatches from San Francisco say that the Southern Pacific, under its new passenger traffic manager, Mr. E. O. McCormick, is taking vigorous action to kill out the ticket scalping business in San Francisco. It appears that the ticket brokers of that city do a considerable business in return portions of round trip tickets.

The Transcontinental railroads, at their protracted meeting in St. Paul last week, decided to make no change in the rates on freight from the East to the Pacific Coast. The jobbers of San Francisco made an urgent demand for a reduction in carload rates on principal commodities, but the railroads decided to continue the present basis, by which the California merchants say that they are left at a great disadvantage as compared with jobbers in Chicago and St. Louis.

The Export Grain Trade of New York City.

At a hearing before the New York State Commerce Commission in New York City, July 7, Mr. J. P. Truesdell, a grain exporter, said that 75 per cent. of the grain exported from the ports of the Atlantic and the Gulf of Mexico was sold by New York merchants. A good deal of the grain exported through Boston is sold by Chicago dealers. In winter a good deal of grain is exported through Southern ports because the grading is more strict at New York. All the other ports except Boston get some grain, more particularly wheat, which probably would move through New York if the inspection were the same at all ports. European buyers, however, do not appreciate the efforts of New York shippers to get the best possible grain for the money.

Mr. C. E. Wilmot testified that during February last, when the rail differential in favor of Southern ports was reduced one-half, merchants exporting through New York did a largely increased business.

In March, however, the Chesapeake & Ohio announced that it could not stand the reduced differential, and then the old conditions returned. Since April, however, the lakes have made the rates, and the differential question will not again be important until the close of navigation. Mr. Wilmot said that he never sent grain by canal unless he could get a lower rate than by rail, as the uncertainty of arrival and the higher cost of storage in New York were a decided disadvantage.

David Bingham, a grain exporter in New York for many years, testified that he shipped from all the principal Atlantic ports. Generally about one-third of his shipments go through New York. Grain can be sent through Boston to English ports at 1 cent a bushel less than through New York; ocean rates are cheaper and storage at Boston is more favorable. To ports on the Continent of Europe, Boston does not enjoy such a marked advantage over New York.

Mr. Bingham says that the International Elevator Company, operating the floating elevators in New York harbor, pays fat dividends and enjoys a virtual monopoly because the grain merchants who patronize the concern are stockholders in it and enjoy the big dividends. The rate for transferring grain from barges to vessels is 1½ cents a bushel, which is half a cent higher than the rate prescribed by the law passed in 1888. The unlawful charge is maintained because those who pay it do not make sufficiently vigorous objection. If an exporter "raises a kick" he can secure a reduction.

A chief reason why Mr. Bingham does not bring wheat from the West by canal is the lack of responsibility in the boatmen. The grain merchant has to deal with a large number of individuals, and moreover it is not right to trust \$8,000 worth of wheat in a \$4,000 boat. The New York Produce Exchange is not likely to take any action toward reducing the charges for transferring grain in New York because the private interests of the members of the Exchange are conflicting.

At one of the hearings before the Commission Mr. Yale Kneeland, a member of the Produce Exchange, gave testimony concerning the export business in grain. The cargo business from New York was formerly much larger than now. At present there is but little such business, except in summer to Portugal. Much corn in cargo lots has gone to Norfolk and Baltimore, because the North Atlantic load line discriminated against New York. Since the abolition of that discrimination New York has done better. In the past the principal grain going to Southern ports was corn, but Gulf ports are now taking large quantities of hard winter wheat. Spring wheat comes to New York because it is grown in territory naturally tributary. This year the spring wheat crop will be larger than that of winter wheat; this will favor New York. The wheat that goes to Gulf ports is a permanent loss to New York. Mr. Kneeland thinks that the severe grain inspection at New York does not greatly affect the trade.

Chicago Traffic Matters.

Chicago, July 12, 1899.

The presidents and other chief officers of the Central Traffic and Trunk lines, after a three days' meeting in this city, have agreed to advance the present rates on wheat, corn and oats from Chicago to the Atlantic seaboard. There seems to be still some uncertainty about the exact amount of some of the increases, but, as given out last Monday, the changes are as follows: On domestic shipments of grain and grain products except corn, an advance from 11½ to 17 cents per 100 lbs.; and corn will go up from 10½ cents to 15 cents. On export business the rates from Chicago to New York on corn will be changed from 10½ cents to 11, and on oats from 10½ to 13 cents. The present 17-cent export wheat rate will be continued. The executive officers hope that the new rates, which are still very low, compared with those in effect during past seasons, will be strictly maintained. On provisions, both export and domestic, rates will be 25 cents, an increase of 5 cents in the export rates. The new rates will become effective Aug. 1. It has been noticed, and is by some regarded as significant, that the Grand Trunk has not been represented by its leading officials, and they appear to have been indifferent about reaching an agreement.

The railroads running from Chicago to the cities and summer resorts on the east coast of Lake Michigan are going to make a determined effort to get a share of the big business that is carried between Chicago and the other side of the lake by the boat lines. The summer resort travel, to Charlevoix and Mackinac particularly, has never been touched by the railroads. The Michigan Central and the Grand Trunk have now made a passenger tariff between Chicago and the Michigan points that is almost as low as the boat rates. The reductions run from \$1.40 between Chicago and Grand Rapids (one way) to \$3 to Mackinac Island.

The Northern Pacific and the Great Northern roads have refused to join the other trans-Missouri lines in advancing car-load rates to Pacific Coast points. These two lines have issued a notice to the effect that they will continue their present adjustment of rates.

Officers of the Western roads who have returned from New York feel rather disappointed over the refusal of the Kansas City, Pittsburgh & Gulf in connection with the Morgan and Mallory steamship lines to agree to advance freight rates from New York and the East to southwestern Missouri River points. The present 95-cent scale is ridiculously low, and officers of the southwestern roads were anxious to have it advanced.

The Iowa Central has joined the Western Passenger Association. The Executive Committee of the organization has been re-elected. Assistant Chairman Lee has been appointed General Passenger Agent of the Delaware, Lackawanna & Western.

Kansas stock shippers are still protesting at the action of the Western roads in abolishing the long established feeding-in-transit rates.

Travel to the Yellowstone Park is heavier than it has been for years. Business to the National teachers' meeting in Los Angeles, Cal., was very large. Many of the teachers will return East over the northern routes.

Receipts of flour and grain at Chicago for the half year ending June 30 were 140,525,000 bushels, a decrease of 5,000,000 from the corresponding period of 1898. There was a heavy falling off for the first five months, which was partly offset by a large movement in June. Receipts of live stock were 136,492 cars, just about the same as in 1898.